SEQUENCE LISTING

<110> EFARMES, S.A.

<120> Method and device for detecting low density lipoprotein receptor gene mutations associated with familial hypercholesterolemia

<130> PCT-154

<160> 259

<150> ES200300206

<151> 28.01.03

<150> ES200302671

<151> 17.11.03

<210> SEQ ID NO.: 1

<211> 60.000

<212> polynucleotide

<213> human

<220>

<221> gene

<223> rLDL

<400>

aaaagatggt gtatccattc aatggaacat tatttggcct ttaaaaggaa ggaaattctc 60 actgagcata gtggtttatg cctgtaatcc cagcactttg ggaggctgag gcagggggg 120 ggggggggtt cacctgaggt caggagttca agaccagcct ggccaacatg gtgaaatccc 180 gtctctacta aaaatacaaa aaaattagcc gagtgtggtg gcacacacct gtaagccagg 240 ctacacggga gactgaggca ggagaatcgc tggaacccgg.gaggcagagg ctgcagagag 300 ccgagattgc gtcactgcac tccagcctgg gtgacagagc gagactcttg tcttaaaaaa 360 aaaaagaagg aaggaaggaa ggaaggaagg aagttctgac acacggctca acacagatgt 420 tatgctcagt gaaataagcc agacatgaaa ggacaaatac tgcctgatct cattcataag 480 aggtccctag aattgtagaa tggtgtgtgc cacgggctgg gagggggtgt ggccagagtt 540 tcagtttggg aagttgagaa tgttctgag atggatggc gtagtggtgg ttgcacaact 600 gcggtggctc atgcctgtaa tcccagcact ttgggaggcc gaggcaggtg gatcatgaga 720 tcaggagatc gagaccatcc tggctaacac ggtgaaaccc catctctact aaaaaataca 780

```
aaaaattagc caggcatggt ggtgggcacc tgtagtccca gctacttggg aggcggaggc 840
aggagaatgg cgtgaacacg ggaggcagaa cttgcagtga gccgagatca cgccactgca 900
ctccagcctg ggcgacagag tgagactccg tctaaaaaaa aaaaagtggt taagatgggc 960
cgggcatggg ggatcacgct tgcaatccca acactttggg aggctgaggt gggtgattac 1020
gaggtcagga gttcgagacc agcctgacca ccatggtgaa accccgtctc tactaaaagt 1080
acaaaattag ccgggtgtcg tggcacacgt ctgtaatccc agctactggg gaggctgagt 1140
tgggaggatc acctgagccc agggaggtcc aggctgcagc aagccatgat tgcaccactg 1200
cactccagcc tgggtgagag agtgagaccc tgtctccaaa caaacacaca tgaaaaacag 1260
attttttttg ccaggtgcag tggctcacac ctgtaatccc agcactttgg gaggccaagg 1320
cgggtggatc acgaggtcag gtgactgaga gcatcctggc taacacggtg aaaccctggc 1380
tctactaaaa atacaaaaat ttagccgagc atggtggtgg gcacctgtag tcccagctac 1440
tcgggaggct gaggcaggag aatggcatga acctgggagg cggagcttgc agtgagctga 1500
gatcacgcca ctgcactcta gcctggggga cacagcaaaa ctgtctcaaa aaaaaaaaa 1560
aaggtttttt taatttaaaa aggaaagaaa aggagagtgc tcgtgtggca ggcacctagc 1620
cetgtecage geaccetgag acagggatga tgtetectee ttgacctaag accacaagtt 1680
ctaaccaatt caaccgagga cagagcccca attccaggca gggcaatggg gtcgccttgt 1740
gaactaagat gcagatggag aagagcagac acagacacag gtcttggggc ccctgcaggg 1800
gtttctcact ggctttttcc ccctggattc ctatgggttc tggggaacag agttaggtcg 1860
gctggcaaga cagatgcatg aggctgtggc gcccttgaca ttgagccgga gggccagagt 1920
tegteattge tgacgeagag aagetgggag ceaaggttag ceagatggtt tggaggagtt 1980
ttaaacaatc ttttcttttc tttctctttc catctgtctg tccttctttc ctcccttcct 2040
geoccettte tttteteett tettteette eteteteett cetecetttt tttettttt 2100
tttggttttc tttttgtatt agtattatta ttttttagac agggtcttgc tctgttgccc 2160
aggctggagg gcagtggcac gatcacagct cagtacaccc tcaaccttct gggttcaagc 2220
aatcctcctg ccttggcctc ccaggtagct gggactacag gcgtgtgcca ccacacctgg 2280
ttaatttttt ttttttttga gacggagtct tgctctgtca cccaggctgc agtgcagtgg 2340
cgtgatctcg gctcactgca acctccacct cccgggttca agcgatcctc ctgcctcagc 2400
ctcccgagta gctgggatta cacgcgcccg ccaccaagcc cggctaattt ttttattttt 2460
agtagagaca gagtttcacc acgttggcca ggctcgtctc aaactcctga cttagtgatc 2520
tacccacctt ggcctctcaa agtgctggga ttagaggcgt gagccaccat gcgcagccaa 2580
tttttgtatt tttagtagag atggggtttc accatgttgg tcagtctggt ctcgaactcc 2640
tgacctcaag tgatccacct gcctcagcct cccaaagtgc tggaattaca ggcatgagcc 2700
accgcgccca gccctcttaa ccatttttaa gtgcacagtt cagcagcatt aagcacattc 2760
acattgttgt gcaaccatca gcccccgtcc atctccagct ttctcttttt ttttgtttgt 2820
tttgagacag ggtcttactc tctcgcccag tatagagtgc agtggtgcgg tcttggctcg 2880
ctgcaacctc tgccttccag gttcaagcta ttctcctgcc tcagtctccc cagtagctgg 2940
gattacagac acacatcacc acgccctgct aattattttg catttttagt agagatggtg 3000
```

tttcaccata ttggccaggc tgatcttgaa ctcctggcct caagtggtct gctccaaact 3060 gctgagatta cagccgtgag ccactgctcc cagccatctg cacctttctc atcttcccaa 3120 atgtaactat gtccccgtga aacactcact ccccattcca cctccccagc ccctggcacc 3180 ccccatttta ttctggtgct aggggaattt caaaccaggc aagtctcaac acatgctcga 3240 gtgtaagaac cagcccacag cctcgttccc taatcacggt caaaccagaa ttctactcca 3300 ggttctactc tgtgaatctg ctttctgtga atctgttact ctggggaccg cctataagtt 3360 gaatcctaca gtgtctccac ttcagtgact ggcttatttc acttttctcc tctttattta 3420 tgagacaaaa tttcgctctt gttgctcagg ctggaatgca atggcgtgat ctcggctaat 3480 ttttttgtat ttttagtaga ggcggggttt caccatgttg gccaggctgg tctcgaactc 3540 ctgacctcag acgatccact ttggccttcc aaagtgctgg gattacaggc gcggcccacc 3600 tttctcctct taatcacaca ggtaatccat acatacgaca ttcttttttt tttttgacac 3660 ggagtettae tetgteacet aggetggagt geagtggege aatettgget caetgeaace 3720 tetgeeteee aggateaage aatteteetg ceteageete etgagtaget gggattacag 3780 gtaaccatca ccacacctgg ctaaattttg tatttttagt agagacgggg tttcaccacg 3840 ttggccacgc tggtattgaa ctcctggctt caagtgatct tcctgtctcg gtctcccgaa 3900 gtgctgggat tacaggaatg agccactgtg cccggccaat acgacatctg tgcaatgaag 3960 tgcaacatat aagacaccet teeeccaeee actgeeeeea eeaeegeeee caegeeeeea 4020 cccccatctc cagatcagaa cctggggctg tgcaatttta aacgttgtag ccacttgcta 4080 cttgggtagt tgaagttcag tctcagccag gttggagtcc tggactctgg cccctctttt 4140 atttttattt tttattttt tttgagacag agtctcgctc tgtcgcccag actggagcgc 4200 agtggtgcga tctcggctca ctgcaagctc tgcctcctga gttcacgcca ttcccccgcc 4260 teageeteee gageagetgg gaetaeagge geeegeeace acaccegget aatttettgt 4320 attitttagt agagatgggg titcaccctg tiagccagga tggtctagat ticctgacct 4380 tatgatccgc ctgcctcggg cctcccaaag tgctgggatg acaggagtga gccaccgcgc 4440 ccggcctctt ttttttttt tagacagtct ctgtcaccca ggctagagtg cgatggtgcg 4500 atttcggctc actgcaacct ccaccttccg ggttcaagcg attctcctgc ctcagcctcc 4560 tgagtatctg ggattacagg tgcctgtgac cacgcccggc tgatttttgt atttttagta 4620 gagacggggt ttcaccacat tggtcaggct agcctcaaac tcctgacccc gtgatccttc 4680 cgcctcagcc tcccaaagtg ctgggattac aggactctgg cccatcttgg ctgctgccaa 4740 tgtccttcct tctatcttgg tttttccaca gttacgcaca tgccagataa cggcgagtct 4800 gttccccagc aactgcaacg gatctgccca ccactgggaa atggaagacc ttgcagccca 4860 ggtctttgta gaccaagatt agattgtggt caacaaacac ctgaccttgg cctttggaac 4920 catcagccat gtcagctaaa ataaaagcag aatctggctg ggcgcagtgg ctcacgcctg 4980 taatcccagc actttggggg gctgaggtgg gcagaccacc tgaggtccgg cgttctagac 5040 cagcctgacc aatatgatga aaccccgtct ctactaaaca tacaaaaatt agctgggcat 5100 ggtggcgggc acctgtaatc ccagctactc gggaggctga ggaaggagaa ttgcttgaac 5160 cctggaggca gaggttgcag tgagccgaga ttgcgccact gcactccaac ctggactgca 5220

gaacaagact ctgtcccaaa agcagataaa taaaaataaa taaaaataaa aatatggccg 5280 ggcatggtgg ctcacacctg taatcccaac actgggaaga tgaggcgggc agatcacgag 5340 gtcagggatt cgagaccagc ctggccaaca tggtgaaacc ccgtctctac taaaaataca 5400 aaaattagcc gggcatgatg ctgcatgcct gtaatcccag ctactctgga ggctgaggca 5460 ggagaatcgc ttcatcccgg gaggtggagc ttgcagtgag ctgagatcgc gccactgcac 5520 ctctgtctcc cgggttcaag tgattctcct gcctcagcct tccaagtagc taggattata 5640 egegeeegee accatgeetg getaattttt gtatttttag tagagatgeg gttteaccat 5700 gttggccagg ctggtctcaa actcctgacc tcacgtgatc cacctgcctc ggcctcccag 5760 agtgctggga ttacaggtgt gaacccctgc gcctggccaa gaaaagttgc ttgaatgaag 5820 agtaaataga agacccagaa agaaatgatt cgtccgagga aggtcacaga agcaacgtaa 5880 tcaagatgga aatctgactc ttcctaattt tggccagact tcccatccct ccaaagcttt 5940 ccagactett ccagateatt ctagatattt ccagaaatea ttegtgaaat ctaactagga 6000 gtagtctgta aacaatgtgt ttcacacaga tacaattcat aaacgatgag aagacaagga 6060 cacttcatga atgaaatttt tacggccggg tatgttggct cacgcctata atcccaggac 6120 tttggaagac ccaggcagga ggattgcttg agtccaggag ttcaagacca gtctgggcca 6180 catagtgaga ccctgtcgct acaaaaaatt taaaaattag gtagatatgg tggtgtatgc 6240 ctctagtttt agcttttttg gaggctgaag caggaggatc tcttgagccc aggaggttga 6300 gctgcaatga gctacgattg aactactaca ctccagtctg ggtgacagag aaagaggctg 6360 cctcaaaaaa ataaaaataa aaaaataagg ccggacgcgg tggctcacgc ctgtaatccc 6420 agcactttgg gaggctgggg tgggcagacc acgaggtcag gagatcgagg ccatcctggc 6480 caacatgatg aaaccetgte tetaetgaaa acacaaaaat tagetgggeg tggtggegta 6540 tacctgtaat cccagctact cgggaggctg aggcaggaga atcacttgaa ccagggagtc 6600 agaggttgca gcgagaggag attgtgccac tgcattccag cctggcaaca gagcaagact 6660 ccgtctcaaa aaagaaacaa caacagcaac aacaacaaaa aaaacataaa aaagttcggg 6720 cacggtggct cacacctgta atcccagcac tttgggaggc caaggtgggt agatctcttg 6780 aggtcaggag ttcaagacca gcctggccaa caaacatggt gaaaccccgt ctctactaaa 6840 aatacaaaaa gtagccgggt gtagtcccag ctactcggaa ggctgaggca ggagaatcgc 6900 ttcaacctgg gagatggaag ttgcagtgaa ctgagattgc gccactgggt gacagagtaa 6960 gactettgte teaaaaaaaa aaaaagaaag aaagtttaat ttaatgatte aaataatgae 7020 ctgctcgaga gataaatata aagtctaacg taagaggtgt atactttttc ctctgtcctg 7080 ctgtcctcgc cccacctcac cccaagtccc aacctgattg atcagtctcc tttccctctg 7140 gtagccccac tcccatgacc gaaccgagaa gtcatgcacc cgcataagaa ctctaatttt 7200 ttttttcaaa gtcttctcac tgccccaaaa atagtttctt tcattcccag gggatgtgaa 7260 agtgtctctc ccaattttat ttcaacctcc cagcgttcca cacatatgcc ttgcctcagc 7320 cagettteae tgatetgeea tttecacete ggegetgete etacetgegg aaateetgte 7380 catccatagt ctgatttctg ttgttccaga acattctttt ttttttcccc tggaacattc 7440

tttaagatac ctcaataaat gaaaccagag ggtatagagc agtatgaatg ggtactacaa 7500 tgtacagggg gaaatggagg ggaatatgat atactctcct ccttgtatat gcttagaatg 7560 ttctagaagg atatgcttaa aaggttagca gtcctggcca ggcgtggtgg ctcacgcctg 7620 taatctcagc actttgggat gccaacgegg acggatcaca aggtcaggag ttctagatca 7680 gcctgaccaa tatagtgaaa cctcatcttt actaaaaata caaaaattag ccgggtacgg 7740 tggcatgtgc ctgtagtccc agctactttg gaacctgagg caggagaatc gcttgaactc 7800 gggaggcaga ggttgcagtg agccgagact gtgccattgc actgcagcct gggtgacaga 7860 acaggactcc gtctcaaaaa aaaacaaaaa aggtcagcag tcttaattgt cagagggcag 7920 gggacctgca tgggatggag gtttttccat gtgtccacct tttgagccct tttgcttttt 7980 ttttttaaat ctttttattg tagcaaaata gatataaaat ttaccctttt tttttttgag 8040 acagggtete actetgttge ceaggttgga gtgeagtgge atgatettgg etcaetgeag 8100 cctctgcctc ctgggttcaa gcgattttcc tgcctcagcc tcccgagtag ctgggattac 8160 aggtgettge caccatacce ggetaatttt gtatttttag tagagaeggg gttaegeeaa 8820 gttggccaag ctggtcgcaa actcctgacc tcaagtgatc cgccccctc ggcctcccaa 8280 agtgctggga ttacaggcag gagccaccac gctcagccct aaaatttacc atattaacca 8340 ttttcaagtt cagaggcatt aaagtatact cacattgttg ttcaactgtc accactactc 8400 acctgcagaa gtttttcatc ttgcaaagtg aaaaccccat acccaatttc ccgttcttcc 8460 teteageece tggtaateae tattetaett tttgtetaet ttttgtatga atttgeetat 8520 tctaggacct aatagaagtg gagtcaaacc tgtttgtcct tttgtggctg gcttatttca 8580 cccggcctta tatcctcaag gtttatccat gttggaggat gcctgaattt ccttgttttt 8640 aaggetaaat titattetat tatattaata tgteatattt tgtttateet gatggacaet 8700 tgggttgatt ccacctttgg ccattttgaa gaagcttcta tgtacatggt atacacatat.8760 atctttgggt.ctctgctttc aatgcttttg.gggatatttc.agatgtggaa.tttctggatt.8820 ataaggcaat.ttttttttt.gagacagact.ctcgctcttg.tcgcccaggc tagaatgtgg 8880 tggtgtgatc tatttttttt ttttttttga gatggagtct cgctctgtcg cccaggctgg 8940 agtgcagtgt cacgatetea geteaetgea ageteegeet eeeaggtteg tgeeattett 9000 atgeeteage eteceaagta getgggaeea eageegeeea eeaceteace eggetaattt 9060 ttgtattttt agtagagaca gggtttcact atgttggcca ggatggtctc gatctcctga 9120 cctcgtgatc cgcctgcctc ggcctcccaa agtgctggga ttacaggcgt gagccactgc 9180 acceggetgg tgtgatettg getegetgea acctetgeet eccaggttea agegattett 9240 gtgcctcagc ctctccgcag ctgggactac aggtgtgcgc cactgtgccc agctactttt 9300 taaaaatata tgtgtattta ttatactttt aagttctggg atacatgtac agaacgtgca 9360 ggtttgttac ataggtatac atgtgccatg gtggtttgct gcacccatca accggtcatc 9420 tacattaggt attteteeta atgetateee tteeetagee eteeaetete eeggtttttt 9480 gttttgtttt gttttgttgt tttgttttta gtagagacag ggtctcacca tgttgcccag 9540 gctagtcttg aactcctgac ctcaagtgat ccgcccacct cagcctccca aagtgctggg 9600 attacaggtg tgacccacta cactcggcct tattttcact tatttatgca attttcacta 9660

ttgctatatt ctaggaggca ctgtggaatt gcactgtgga attttagtat tgctgtattt 9720 cagcaagcca tgaggtctgt cagcacacgg ctttgggcat tttgtgaaga taactgatgc 9780 cagetgagee aaggeaggtt cetgatteea eecaetggea ggeacegagg tetetgetgt 9840 tactgatggt ttctctgtgg attgatgggc ttaaggccag accacagctg caatggctca 9900 cctctgccaa aggccaggct cgttggggca gagacctatt ccggactgag cctcctggtg 9960 aattagagag gtagaaaatg ggaggacggg ggcaggtggg ctattacagc gaggaaaatg 10020 cccaccctga gttgtattag ataactttgg gagttcagga actttccaat aaagtgggtt 10080 ccacagcagg attacttact gactccctaa tagaaagaag gcaggcacag gccgggcgtg 10140 ttggctcatg tctgtaatcc cagcacgttg ggaggctgag gcgggtggat cacaaggtca 10200 ggagatccag accatcctgg ctaacaaagt gaaaccccgt ctctactaaa aatacaaaaa 10260 attaggetgg gegtggtgge tegtgeetgt aateceagea etttgggagg etgaggeggg 10320 cggatcacga ggtcaggaga tcgagaccgt cctggctaac acggtaaaac cccatctcta 10380 ctaaacatac aaaaaaaat tagccaggtg tggtggcggg cgcctgtagt cccagctact 10440 caggaggetg aggeaggaga gtggtgtgaa etegggagge geagettgea gtgageegag 10500 actgcgccac tgcactccag cctgggcaac agacagagac tccgtctcaa aaaaaaaaa 10560 aaaaaataca aaaaattagc caggcgtggt ggcacgtgca cgtgactgta gtcccagcta 10620 cttgggaggc tgaggcagga gaattgtttg aacccgggag acggaggttg cagtgagccg 10680 agategegee aetgeaetee ageetgggtg acagagetag aeteegteaa aaaacaaaaa 10740 acaaaaaaca aaaaaacaaa aaaaaaaaaa cagcaggaac tggcaggtct tccctgaaga 10800 gataaaaaaa aaaaaatgca gttgcaacac aaaagcagcc acagagaaaa gcaaacccat 10860 acageetgge tetgttgatt gggetggagt geagtggege gaeegtaget eattgeagee 10980 tcaacctcct tggctcaagc aatcctccta cctcagcctc ctgagtagct gggaccacag 11040 11100 gtgtgagcca ccacgcctgg ctaattgttt ttttttttt tgtagagaca gggtctcact atgtggccca ggctggtttc caactcctgg gctcaagtga tcctcccacc tctgcctccc 11160 11220 aaagtgetgg ggattacagg catgageeac etegeetgge etetagtege tttatatatt ttaacttaat ccttacaaga gccctgtgag ctagttacag gagcacaaat ggaaaccaag 11280 11340 aaacagaaaa atttatcagc atgactcagt cctcagagcc atgtatggcc gtgtccgtgc atggcaggca ggtcaggggc ctggggaacg ctgttctgga aaccttggcc aggccttggc 11400 accegaggaa tgtgetttte agagtttttg tggetetttt ceagacetge cetgacetet 11460 agetetggga aetatgtaag eeaagtgeet teegggaagg gagteeetet eetggtaaet 11520 ctttctgggt aaccagatgt ggactcatga cacacactga gcctacgtct tataattttt 11580 tgtttttgtt tttgagacag tttcggtctt cttgcccagg ctggagtgca atggtgcgat 11640 cteggeteae tgeaacetet geeteecagg tteaagegat teteetgeet eageeteeet 11700 agtagetgga attgeaggea tgegeeacea egeetggeta attttttgta ttttttttt 11760 tttagtagaa acggggtttc accttgttag ccaggctggt caccaactcc tgacctcagg 11820 tgatccgccc acctctgcct cccaaagtgc tgggattaca ggtgtgagac agctgtgagc 11880

caccacgccc ggcgcatttt ttttttcttt tttttcagag ggagtgtccc tctgtcaccc 11940 aggetgaagt gtagtggegt gateteggee caetgtaace tetateteee aggtteaagt 12000 12060 gatteteetg acteageete ecaagtaget gggactacag gegeetgeta ecatgeetgg ctaatttttg tagttttagt agaaaccggg ttttgccatg ttggccaggc tggtctcaaa 12120 12180 ctcttgactt caggtgatcc acctgccttg gccttctgaa gtgctgggat tatagggcat gagccactgt gactggccat cttaaatttt ttttttttt tttttttt ttgagacagg 12240 gtttcactct gtcgcccagg ctggagtgca aaggcgcgat cttggttcac tgcaagctcc 12300 gcctcctggg ttcatgccat tctcctgcct ctgcctcatg agtaactgag actacaggcg 12360 12420 cccaccacca cgcccggcta atttttttgt atttttttag tagagatggg gtttcacctt 12480 gttagccagg atggtctcga tctcctgacc tcgtgatcca cccgtctcgg cctcccaaaa 12540 tgctggcatt acaggcgtga gccaccgcac ccagccttaa attttttttt aagggaaatc 12600 aaacccagtg atattgggcc agtacagtgg ctcacacctg taattccacc actttgggag gctgaggcag gtgaatcacc tgaggtcagg agttcgagac cagcccggca aacatggcga 12660 12720 aaccccgtct ctactaaaaa taagaaaatt agccgggcgt agtggcatgc acctgtaatc 12780 tcagctactc gggaagctga ggcatgagaa tcgcttgaac ctgggagcag gacgttgcag tgaaccgata tcacaccact gcactccagc ctgggtgaca gagcaagact ctgtctcaaa 12840 aaaaaaaaga aaaaaaaatc cagtgatact tactttttaa atttttattt acttattttt 12900 12960 tgctttaagt tgaatcttta aacttatctt tatttttgag acacagtctc actctgtcgc 13020 ccaggctgga gtgcagtggt acaaccacag ctcagtgcag cgttgacctc ctgggctcaa gccatcctcc cgcctcagcc tcccgagtag ctgggactac aggcgcacac aaccatgtcc 13080 agettatttt tgtatttttt gtagagacag ggteeeaetg tgttgeeetg gettgttetg 13140 13200 aactootagg otoaagtgat oooocogoot caccotooca aagtgotggg attacaggca tgagccacca catccagact tcactttttt gtttaatgtc gcaaatggca taaggaatgg 13260 13320 gattcaatgg ggacacattt ataaacgttg cagcagctcc tagaacttgc ctatccttgt aaacttctct aggtgattgc taattacttc ttttttttt ttttttttg agacggagtc 13380 teactetgte geceaggetg gagtacagtg gegeaatete gteteactge aaacteeace 13440 tecegggtte aegecattet eetgeeteag eeteeegagt agetgggaet aeaggeaeee 13500 gccaccacgc ccggctaatt ttttgtattt ttttttagta gaggtggggt ttcactgtgt 13560 tatecaggat ggtettgate teetgaeete gtgatecaee tgeeteagee teeeaaagtg 13620 ctgggattac aggcgtgagc caccatgccc agcccgctaa ttatttcaat ttgaccttga 13680 cactgagcct gccaagtagg ttcaagcatt ttgatggccc ctttacaggt tgggaaagct 13740 aatttatctg tccaaggccg aattctgaaa ctgagtctta actgccaaaa attcttatca 13800 13860 tcaatttctt cttctgggtt gggcacagtg gctcatgcct gtaaagccag caatttgaga ggcatcatga tgcaagagga agaggattga gtgaagctag gagtttggga ccagcctggg 13920 13980 caacatagtg agaccccatc tataaaaaaa aattaaaaat tagttgggca tggtggtgca ctcctgtggt cctagctatt caggaggctg aggtgggagg attccttgag cccagggttg 14040 acgctgcaga gagctgtgat cacgccactg cagtccagcc tgagtgacag ctggaaataa 14100

14160 tttccctgat taatcttttt ttttgtcctt ctgagagttc aatttgtccc ttttctgcct 14220 ggtctcctag gtttccctaa aatcctgctg agaggttagc actgcctgcc aaagtcagtt 14280 tgcaaaatcc cagagaaatc cagcttattc ctgggggaac cgccaagact gcccagccct 14340 gtgtggggtt caggcaagtt tctcacatgt gcctttttgg caagaggcct ctggcaaccc 14400 catgagtccc caaagagact caattctaaa agttggtctc caccagctct ctgtggctta 14460 ggggttcaag ttcaactgtg aaagccctgt tttgttttga ttttgctttg agggagagga 14520 aaccgccctt ctgtttgttc aactccttct cctaagggga gaaatcaata tttacgtcca 14580 gactccaggt atccgtacaa ttgatttttc agatgtttat actcagccaa aggcgggatc 14640 ccacaaaaca aaaaatattt ttttggctgt acttttgtga agattttatt taaattcctg 14700 attgatcagt gtctattagg tgatttggaa taacaatgta aaaacaatat acaacgaaag 14760 gaagctaaaa atctatacac aattcctaga aaggaaaagg caaatataga aagtggcgga 14820 agttcccaac atttttagtg ttttcctttt gaggcagaga ggacaatggc attaggctat 14880 tggaggatet tgaaaggetg ttgttateet tetgtggaca acaacageaa aatgttaaca 14940 15000 gttaaacatc gagaaatttc aggaggatct ttcagaagat gcgtttccaa ttttgagggg gegteagete tteaceggag acceaaatac aacaaateaa gtegeetgee etggegaeae 15060 tttcgaagga ctggagtggg aatcagagct tcacgggtta aaaagccgat gtcacatcgg 15120 ccgttcgaaa ctcctcctct tgcagtgagg tgaagacatt tgaaaatcac cccactgcaa 15180 actoctocco otgotagaaa cotoacattg aaatgotgta aatgacgtgg gooccgagtg 15240 caatcgcggg aagccagggt ttccagctag gacacagcag gtcgtgatcc gggtcgggac 15300 15350 actgcctggc agaggctgcg agc atg ggg ccc tgg ggc tgg aaa ttg cgc

met gly pro trp gly trp lys leu arg

-21 -20 -15

tgg acc gtc gcc ttg ctc ctc gcc gcg gcg ggg act gca g gtaaggcttg 15400 trp thr val ala leu leu ala ala ala gly thr ala v

-10 -5 -1 1

ctccaggcgc cagaataggt tgagagggag cccccggggg gcccttggga atttatttt 15460 ttgggtacaa ataatcactc catccctggg agacttgtgg ggtaatggca cggggtcctt 15520 cccaaacggc tggaggggc gctggaggg ggcgctgagg ggagcgcgag ggtcgggagg 15580 agtetgaggg atttaaggga aacggggcac cgetgteece caagteteea cagggtgagg 15640 gaccgcatct tctttgagac ggagtctagc tctgtcgccc aggatggagt gcagtggcac 15700 gateteaget caetgeaace teegeeteee gggtttaage gagteteete teteageete 15760 ccgaatagct gggattacag gcgcccaacc accacgcccg cctaattttt gtatttttag 15820 tagagacggg ttttcaccat tttggccagg ctggtctcga accccgacct caggtgatct 15880 gcccaaaagt gctgggatta caggcgtcag ccaccgcgcc cggccgggac cctctcttct 15940 aactcggage tgggtgtggg gacctccagt cctaaaacaa gggatcactc ccaccccgc 16000 cttaagtcct tctgggggcg agggcgactg gagacccgga tgtccagcct ggaggtcacc 16060

gegggeteag gggteeegat eegetttgeg egaceeeagg gegeeactge cateetgagt 16120 tgggtgcagt cccgggattc cgccgcgtgc tccgggacgg gggccacccc ctcccgcccc 16180 16240 tgcccccgcc cctttggccc gcccccgaa ttccattggg tgtagtccaa caggccaccc 16300 tegagecaet eccettgtee aatgtgagge ggtggaggeg gaggegggeg tegggaggae ggggcttgtg tacgagcggg gcggggctgg cgcggaagtc tgagcctcac cttgtccggg 16360 gcgaggcgga tgcaggggag gcctggcgtt cctccgcggt tcctgtcaca aaggcgacga 16420 caagtcccgg gtccccggag ccgcctccgc gacatacacg agtcgccctc cgttatcctg 16480 ggccctcctg gcgaagtccc cggtttccgc tgtgctctgt ggcgacacct ccgtcccac 16540 16600 cttgtcctgg ggggcgccct cgccccacca gccccgatca agttcacaga ggggcccccg 16660 gccaccetea aggeeteggt teettaegag gttgaaaegt tgeeteagaa teteecegee 16720 cctccttggt ctgcagccga gatcttcagc cacggtgggg cagctatccc ccgggaccga ccccctgggg tggcctcgct tcttcagagg ctgtgaatgg cttcggttca gctgtccaag 16780 cggcgatttt tcctctgggt gaaatggatt agattttaga tttccacaag aggctggtta 16840 gtgcatgatc ctgagttaga gctttttagg tggctttaaa ttagttgcag agagacagcc 16900 16960 tegecetaga caacagetac atggecettt ceeteetgag aaccageeta geetagaaaa 17020 ggattgggat tgcctgatga acacaaggat tgcaggaaac ttttttttta attggcaagg gggttggctt tgactggatg gagagctttg aactgccttg aaattcacgc tgtaactaac 17080 acaccagttt cctctgggag gccagagagg gagggagggt gtaatgaaat acggatgatt 17140 gttcttttat ttttatttac ttatttattt tttaactttt tgtagagatg aggtctcgct 17200 tggttgctca ggctggtctt gaactcctgg cctcaagcga tcctcctacc tcagcctccc 17260 17320 aaagtgttgg gattacagga gtgagccacc gcgccccacc ggggatgatg atgattgcaa 17380 acattctgcc actcagtttt acaaaagaaa gagaggcact ggattaatgt gtatctcact caccaatcaa cctcttcctt aagagaaaat gttaaggaag tcttaggcaa ggccttgttt 17440 gttcatcact ttagtttctc tctcccggga tggctgagaa tgtgatgttt cctctgttgt 17500 17560 caaggagact acacccctga tgttttcctc cagacttctg agagctggtg tgtgtttcta gcactttcta gctgcaccac ctcacgctgt agctggcttc aaggcatatc caggggggag 17620 tttcttgtcc atttccttta caaagggaag ttgttggaat ctgaaccgca agccttcact 17680 tagaccaaaa tcaggcaaca geggtgageg cagetecaaa egtgteaatg acteaeceaa 17740 atttgagtaa gggagttggc tgctttaacg agccgcaggg tgattccctt gtcatttccg 17800 17860 gaaataccta tcttccaggg aacactggga aaaaacaggg agacctttgt tgagacagaa aacctgtagg ggaattetgt teeteattee tgetettate tgtagaette eteeetgata 17920 agatecaatt etagatgggt eggttgetee ttgetttgat gggtgetttg atgggettta 17980 ttattattat tattattatt attattattt tgatgggctt tttgatgtcc cttttccttc 18040 cacactetgt cecaactgte aagcaaatag cettttgttg ctaagagaet geagatgtaa 18100 ccgaccagca gcaaacagtg agtcaggctc tctcttccgg aagcaaaatc aattgctgag 18160 atcactctgg ggaaaatacc caccttattt ggaaagaagc actgatcaat tgatgtctat 18220 tttttttttt tttgagttgg agtctcgccc tgtcacccag gctggagtgc aatggcataa 18280 tetegeetea etgeaateee egeeteeegg gtteeageaa tteteetgee teageeteet 18340 gagtagctgg aattataggc gcctgccaca acacccggct aatttttgta tttgtagtag 18400 agatggggtt teaceaegtt ggeeaggetg gtetegaaet eetgaeeteg tgateeaeee 18460 18520 gcctcagcct cccaaagtcc aaggattgca ggcgtgaccc actgtgccag ccaatcaatt 18580 gattteteat teatttteag etggetetgt teeettaage eaggggattt tegtttgttt gtttcccctt caaggaaatg attctagcta cagttttgat ttccttgtac aactgttttc 18640 agtagcacag ggaaagaaaa catcgaaagc attcaccacc tcatttgtgt gctgggggaa 18700 aaagcagaaa tgtgtattct ctttttttgt ttcgatgacc ttgttcctga cttgttactc 18760 gtgacttgag agatcagagg gctagaggac tagaatttat agaggtgttt tttttgtttg 18820 tttatttttg ttcgagttgc ccaggctgga gtgcagtggc gcaatctcgg ctcactgcaa 18880 18940 cctctgcctc ccaggttcaa gcgattcttc ggcctcagcc tcctgagtag ctggaactac aggegeeege caccacacee agetaatttt tgtattttte agtagagatg ggattteace 19000 atattggtca agctggcctc gaactcctga cctcgtgatc cacccgcctc agtttcccaa 19060 agtgctggga gtacaggcgt gagccgccgt gcccggcctt tttgtgttttt tgtgtttttg 19120 agaggagete attgettttt aggetteeet agegtgagaa aatetgggga teeatgetet 19180 agtttacttc cttttttttt tttttttga gatggagtct cgcttagatt gcctaatctc 19240 ageteattge aacttetgee teeggggtte aagggattet egtgteteag eeteetgggt 19300 agctaggata cgggcacccg ctaccatgcc tggctaattt tgtactttta gtagagacag 19360 19420 ggtttcgcca cgttggccag gctggtctcg aactcctgac ctcaggtgag ccgcctgcct tggcctccca aagtgctgag attacaggcg tgagccaccg cgcttggcct aatttgcttt 19480 tcctgaaatt caaatggtct aatatgaaaa acgccaacct tgcttgaaag aataagaaag 19540 aggtgcggtt tcgttgggcc gttgatgttt ggaacaggac tggttttgtc cccttgctcg 19600 gaaagggcag caactgtgag gacageteee tgaegtgete teaeteagea etgtteegtt 19660 cctgagcact gtccccacta gctaggccaa gggagctcat ttggcaggca actgctgtct 19720 ggctgcgcct gtggcagtaa aatctgcctt tattttttgg aggcagggtc ttgccctgtc 19780 gctcaggctg aagtgtgcag ttatagctca ctgcagcctc cagcttctgt actcaactga 18940 tecteetete teageeteet gagtagetgg gaetataege aegtgttaee aeteceaeet 19900 cagtttgttt gtttatttat ttatttattt atttattgag atggagtttt gctcttgctg 19960 cccaggctgg agtgcaatgg cgcgatctcg gctcaccgca acctccacct cctggttcaa 20020 gegattetee tgeeteagee teetgagtag etgggattae aggeatgeae caccaegeee 20080 ggctaatttt gtattttteg tagagatggg gttteteeac attggtteag getgtteteg 20140 aactcccaac ctcaggtgat ccacccgcct cagcctccca aagtgctggg attataggcg 20190 tgagcccccg aacccggcca ctcccagcta agtttaaatt ttttgtttgt ttgttcgttt 20260 gtttttattt tttgagacag agtctcccgc ccaggctgga gcgcagatca ctgcatcctt 20320 gacctcccag gcttaagcca tcctccccac tcagcctccc aagtagctgg gattacaggt 20380 gtgtgccact atgcttggct aagttgtgta ttttttgtag agatggggtt caagggattc 20440 tegetttgtt geeteggttg gteteaaaet eetgggetea ageagteete eeteeteage 20500

ctcccaaggt gctggggaaa tccacttttg aaacattgtc tggagagttg cccaggtggt 20560 20620 agatcacaga aataggtcat cgtggggtcc ttcccatggg tgcagtcttg agccacctgt 20680 ggccagcaaa tatttggaga ataatagtca ggggagagct tgaggtccag ggaaaggttt tgtttttctt cagggaaagg tttttattgt tctttatccc tccttaaagg accttcaggt 20740 gttactgaca ttcccggtct acccagtggc acatttagtt tgtaagctgg gccctcgtac 20800 agaggtaggg aggtgagagc attggattag tggtcaccaa agctgcggtc acctagtggg 20860 gtgatcagag geteeteeet taagatettg attgecaaeg eetetggeee aaettteett 20920 20980 tttatttatc gcaagcctcc tggaatctca attgcttttt gcccacccgg tgtgtcagca 21040 caagaaatga gtcatttcct cctttaagca cagttgaaat tgagctgtga gtcagtgagg tgtgtacgat attgtcaaag cggggtgtgt acagtattga cagatctgta gttgggcaag 21100 21160 agaattatca gagtttgtga ccacagcaga ttccaaagct cgactcattt tcttctctct tectteeett tittetitte tittititt tittitigae agagtetege tetgitgeee 21220 aggetggagt geagtggeac aatetggget eactgeagee eetgeeteet gggtteaaat 21280 21340 gatteteatg ttteageete eegagtaget geaattaeag geattegggt teaagtgatt 21400 ctcctgcctc agccacctga gcagctggga ttacaggcgc ccgccaccac gcccggctaa 21460 tttttgtatt tttagtagag acggggtttc accatgttgg ccaggctggt ctcgaactcc tgaactcagg tgatccgccc acttcggcct cccaaagtgc tgagattaca gacgtgagtc 21520 21580 accgcgccca gcctgttctg ttctttaatt ctcaaaacac cctctaggaa gtagagactg 21640 ccattctccc ccattttaca gatcaggaaa ctgagtccca gaaggattta gtcagttacc 21700 caagttgttc tagttaaatg gcctggaaag ccagtgaagc ccaggattgt ctatctaacc 21760 cccttactac tctaactttc agggaatcca catgaatgtg ctgggtcaac catcaaagtt 21820 gaaatggata aagggggctg gatgcggtgg ctgatgcctg taatcctagc actttgggag gccgagatgg gtgggtggat tgcttgagcc caagagtttg agaccagcct gggcaacata 21880 gtgagacacc tgtctctgca aaaaataaat aaaaagttag ctgagtgtga tggtgcaccc 21940 22000 ctctagtcac agctgttgag ttaggcttag gcaggaggat cgcatgaacc tgggaggtgg 22060 aggeggeegt gageeteagt catgecactg cactecaace tgggcaacag agtgaaagee 22120 ggtgtccgaa agagaaagaa aaaaagacat agatacatct tttaaaagtta ggttgtatgt taattaccta caactcagtt tcaactgtgc ttaaaggagg aaatgactca tttcttgcta 22180 22240 catatcaaat tagcccaaaa tgtagtggct taaaacaaca catttatgat ttctcagttt 22300 ttgcgtgtca ggaatttgga agcagcacag ctagacggtt ccagctcagg gtctctcatg aagttgcaat caaaatattg gcaggagaga aaaacatatt ttcagaagct gcaggcatag 22360 gaagacttgg ctggggttga aggatccact tccaagatgg cgcactcagt ggctcttggc 22420 tggaggcete agtteeetge tgegtggage teteceteea getgettgag tggaeteatg 22480 22540 acatgcaget ggeeteeeet ggageagteg atecaaeaat gageatggee atgaaetagg ctcagaagcc actccctgtc gtctctacat tttcctatca gaagcaagtc attaaaagtc 22600 cagtgccact ccaggggaga cgaattaggc tctgccttct gaaaggatta tcacagaaga 22660 tgcggtccta tattcttttt ttaaaattat tctttttttt attttgtaga gatggggtct 22700

tggtatgttg cetaggecag tetggaatte etgggeteaa acaateetgt etetgeetee 22780 caaagtgttg ggattacagg catgagccac tgcacctggt catgtggtca tattttcttt 22840 ttettttttt tttttttttg agacagagte tetgtegece aggetggagt atggtggegt 22900 22960 gateteagtt caetgeagee teegeeteee gggtteaage gatteteetg ceteageete ctgagtaget gggattacag gegecegeea acatgeeeag etaatttttt tagtagagat 23020 ggggtttcac catgttagcc aggatggtct cgatctcctg atttggtgat ccgcccacct 23080 tggcctccca aagtttcaac catcgatcag aacttattga tgtacttatg tagctaggca 23140 cggtggcgcg tgcctgtaat cccagctact tggaagggtt aaggcaggag aatcgcttga 23200 acctgggagg cagaggttac agtgagtcaa gatcatacca ttgcactcca gtctgggcaa 23260 23320 cagaatgaga ctctgtctca aaaacaaaaa acaaaccctt gtatgtgatt ttcctggata 23380 gcatctgtta catcttcaca aagataaaaa gtcagacttg gctgggcatg gtggctcaca cctgtaatcc cagcactgag aggctgaggc aggcagatca cttgaggtca ggaatttgag 23440 accaggetgg geageatggt gaaacceegt etetacaaaa aatacaaaaa ttageegggt 23500 gtggtgtcac gcacctgtat tcccaagcta ctcaggaagc taaggcagga gaatcacttg 23560 aacccagagg tggaggtttg cagtgagttg agattgtgcc attgcactcc agcctgggcg 23620 23680 tttttcttct tggtattgtt accttattat agtaataata agtgcatagt gcatgctgag 23740 ataagcaatc ataatttgtt attgcggccg ggcatggtgg ctccagccta taatcccagc 23800 23860 actttggtca ggagttcaag gccagcctgg ccaatatagt gaaactccat ctctactaaa atacaagaaa ttacctgggc atggtggcag ttgctggtga tccccagcta cttgggaggc 23920 23980 tgaggcagga gaatcgcttg aacctgggaa gcagaggttg cagtgagcca agattgcacc actgcactcc agcctgggtg acagagtgag actctgtctg aaaataataa taataataat 24040 ttgttattgc ttttattgcc ttagtttaca tagggaatca aagtttatac tttgatttat 24100 aaaagttgct ttgattctag ttcacagaac cagaatcttt catataaagg tattagaggg 24160 24220 cccagtgtgg tggctcatgc ctgtaatccc agcatattgg gaggctgagg agggaggatc actttaggag tttgaggcca gcctaggcaa catagtgaga ccttgtctct acaaaaaatt 24280 ccaacattag ctgggcatgg tggcatgtgc ctgtagtccc atttatttgg ggggctgagg 24340 caggaggatc acttgagccc acgaggttca atccaggttg cagtaagcca tgatcctgcc 24400 actgcactcc agtttgggta acagagcgaa gctatgtctc aaaaaaagaa aaaaaaagta 24460 ttctaaatcc aaatttaata tataaaacta aatgcaggcc aagtgtggtg gcatatacct 24520 ataatcacaa cactttggga ggctgaggtg ggaggattgc ttgagcccaa gagttcaaga 24580 ccagcctagg taacacagta agaccccatc tctacaaaaa gtagaaaaat tagcctggca 24640 tggtggtgag tgcttttaat cccaactact tagggggctg agatgggaag attgcttgag 24700 cctcagagtt tgaggctgca gtgggccgtg atcgctccac tgatcgctct aaagtgagac 24760 cctgtctcaa aaaaaaagaa aatagaagaa aactaaatac attcaataag actttgatct 24820 cttttccaag gtgtaaatat attttgggaa attttccagt tactttgttc tcattttaat 24880 gtaataatct aagtettggt tttetaagga aaagttttet ettattatat ettttgttaa

25998-26119

tgtttctctc ccatttcttt tgatctgatc ttcagataca tgattatctt cactgctaaa	25000
tttgtgttct ctggcctcta catttataat ttctcataat tctttatcta agtatttctt	25060
ccctacctac tgaagaaaac tcaagttttc ttccacctta atgattatgc tgtgtctgtg	25120
agttttcttc atgactcttt acagtacaag ttttttgttt ttgtttttt aatggtcaga	25180
tggatagaac aacacaggtt ttgtttgttt tgttttaact tttaaaaaaa ttataataga	25240
taaagggtct cactacgttg tccaggctga tctcatactc ctgggctcaa gcaatccacc	25300
cacctctgcc tcccaaagtg ctgggattac agtcatgagc caacatgcct gggcagtaca	25360
ggtttttttt gagacggagt tttgttcttg ttgccgaggc tggagtgcaa tggcacaatc	25420
ttggctcacc acaaagtctg cctcccaggt tcaagtgatt ctcctgcctc agcctcctga	25480
gtagctggga ttacaggcat gtgccaccac gcccagctaa ttttgtattt ttagtagaga	25540
cggggtttca ccatgttggc caggctggtt tcgaactgct gacctcaggt gatctgccca	25600
cctcggcctc ccaaagtgct gggattacag gcatgagcca ccatgcccag ctgtagtaca	25660
ggttttaata tgctaaatac tcttcctttc tttattaatg tgcatggaag ttctaatatt	25720
tttttcccat accccagaga gtccatattt tggaatcaac aacactagcc tttgttgaca	25780
agtgtctctc ttgggttcct tctttgtgtc ctccactgaa ttttggggtt cataaaattt	25840
catttgttgt gcttgcttaa ttccctggga atcagactgt tcctgatcgg atgacatttc	25900
tggttaattc tttagttggc aggaaataga cacaggaaac gtggtcagtt tctgattctg	25960
gegttgagag accetttete etttteetet eteteag tg gge gae aga tge gaa	26014
al gly asp arg cys glu	
5	
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg	26062
	26062
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg	26062
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp	26062
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20	
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag	
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag yal cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln	
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35	26110
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 To gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 To gag acg tgc t gtgggcatg atatgcatt attttgtaa	26110
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 gag acg tgc t gtgagtcccc tttgggcatg atatgcattt attttgtaa glu thr cys l	26110
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 gag acg tgc t gtgagtcccc tttgggcatg atatgcattt attttgtaa glu thr cys l	26110
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 gag acg tgc t gtgagtccc tttgggcatg atatgcattt atttttgtaa glu thr cys l 40 tagagacagg gtctcgccat gttggccagg ctggtcttga atttctggtc tcaagtgatc	26110 26160 26220
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 gag acg tgc t gtgagtcccc tttgggcatg atatgcattt atttttgtaa glu thr cys l 40 tagagacagg gtctcgccat gttggccagg ctggtcttga atttctggtc tcaagtgatc cgctggcctc ggcctcccaa agtgctggga ttacaggcac cacgcctggc ctgtgacacg	26110 26160 26220 26280
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 gag acg tgc t gtgagtcccc tttgggcatg atatgcattt attttgtaa glu thr cys l 40 tagagacagg gtctcgccat gttggccagg ctggtcttga atttctggtc tcaagtgatc cgctggcctc ggcctcccaa agtgctggga ttacaggcac cacgcctggc ctgtgacacg attcttaacc cctttttgat gatggcggct ggaaaagtgg ccagtggatt ttgatgtatt	26110 26160 26220 26280 26340
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 gag acg tgc t gtgagtcccc tttgggcatg atatgcattt atttttgtaa glu thr cys l 40 tagagacagg gtctcgccat gttggccagg ctggtcttga atttctggtc tcaagtgatc cgctggcctc ggcctcccaa agtgctgga ttacaggcac cacgcctggc ctgtgacacg attcttaacc cctttttgat gatggcgct ggaaaagtgg ccagtggatt ttgatgatt caatcatgaa ttaggaggtg gggagagaat gaattattgg agctttcctt aaagccatta	26110 26160 26220 26280 26340 26400
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 gag acg tgc t gtgagtcccc tttgggcatg atatgcattt atttttgtaa glu thr cys l 40 tagagacagg gtctcgccat gttggccagg ctggtcttga atttctggtc tcaagtgatc cgctggcctc ggcctcccaa agtgctgga ttacaggcac cacgcctggc ctgtgacacg attcttaacc cctttttgat gatggcggct ggaaaagtgg ccagtggatt ttgatgtatt caatcatgaa ttaggaggtg gggagagaat gaattattgg agctttcctt aaagccatta aatggctcta ttgtttttc aattgatgtg aattccacat aacatgaaat taaccagctc	26110 26160 26220 26280 26340 26400 26460
aga aac gag ttc cag tgc caa gac ggg aaa tgc atc tcc tac aag tgg arg asn glu phe gln cys gln asp gly lys cys ile ser tyr lys trp 10 15 20 gtc tgc gat ggc agc gct gag tgc cag gat ggc tct gat gag tcc cag val cys asp gly ser ala glu cys gln asp gly ser asp glu ser gln 25 30 35 gag acg tgc t gtgagtcccc tttgggcatg atatgcattt attttgtaa glu thr cys l 40 tagagacagg gtctcgccat gttggccagg ctggtcttga atttctggtc tcaagtgatc cgctggcctc ggcctcccaa agtgctgga ttacaggcac cacgcctggc ctgtgacacg attcttaacc cctttttgat gatggcggt ggaaaagtgg ccagtggatt ttgatgtatt caatcatgaa ttaggaggtg gggagagaat gaattattgg agctttcctt aaagccatta aatggctcta ttgtttttc aattgatgtg aatttcacat aacatgaaat taaccagctc agtggcatta atacatctgc aatgctgtgt ggccaccacc tctatcttgt tccaaaactt	26110 26160 26220 26280 26340 26400 26460 26520

catectectg ceteageete eegagtaget	gggactacag gcaccctcca ccacatccgg	26700
ctaatttttt gtatctttag tagagatggg	gtttcaccat gttagccggg atggtctcga	26760
teteetgaee tegtgateea eetgeeteeg	cctcccaaag tgctggcatt acaggcgtga	26820
gccaccatgc ccggcctatt tttttttta	agagatggag tetaattetg ttgeccagge	26880
tggagtccag tggtaccatc atacttcact	gcagcettga cetettggge tcaagtgatt	26940
ctcttgcctc gaactcccaa agtattggga	ttacaggtgt gagccaccgc actcagccta	27000
atgtccagtt tttaacaagc tccatttaaa	tgccctccgt tttgacccat aaaggggtag	27060
gcttggccgg gcacaatggc ttgtgtctgt	agtcccagct acttgggagg ctgaggcaga	27120
aaggcagaaa gattgcttta taaagcccag	gagtttgagg gccacctggg tggcatagct	27180
agacctcatc tctaaaaaat aagtaataaa	taaatatttg tttttgtttt tttcttttc	27240
ttttctttt ttttttttt tgagacggag	tettgetetg ttgeecagge tggagtgeag	27300
tggcgcgatc tcagctcact gcaagctgtg	cctcctgggt tcatgccatt ctcctgcctc	27360
agcctcccga gtagctggga ctacaggcgc	ccactaccac gcccagctaa ttttttgtat	27420
ttttagtaga gatggggttt caccacgtta	gccaggatgg tctcaatctc ctgacctcgt	27480
gatccgccag ctttggcctc ccaaagtgtt	gggattacag gcgtgagcca ctgagcccgc	27540
cccatatgta tgtatatata tatttttta	aaatgggaga ccaggcatgg tggctcatgc	27600
ctagaatccc agcactttgg gaagctgagg	taggeggate acttgaggee atgagtttga	27660
gaccagcctg ctcaacatga tgaaacttct	atctctacta aaaaaaaag tgggattagg	27720
teaggeaegg tggeteaeae etgtaateee	agcactttca gaggccgagg caggaggatc	27780
atgaggtcag gagatcgaga ccatcctggc	taacacggtg aaaccccgtc tctactaaaa	27840
aaatacaaaa aattagccag gcgtggtggc	gggtgcctgt agtcccagct actcaggagg	27900
ctgaggcagg agaatggcgt gaacccggga	ggcggagctt gcagtgagcc aagatcgtgc	27960
cactgtactc cagcctgggc gacagagcaa	gactctgtct caaaaaaaaa aaaaaaagtg	28020
ggattgacat tctcttcaaa gttctggggt	tttcctttgc aaagacagga ttggcaaggc	28080
cagtgggtct tttttgtgtg tgtgtgtgtg	acggagtete actetgeeae ceaggetgga	28140
gtgcaatggc aggatctcgg ctcaccgcaa	cctcctcctc ccaggttaaa gtgattctcc	28200
tgcctcagcc tcccgagtag ctgggactac	aggtgcccgc caccacaccc aactaatttt	28210
tgtattttta gtagagacag ggtttcacta	tattggccag gctggtcttg aacccctgac	28320
ctcacgtgat ccacccgcct tggcctccca	aagtgctggg attacaggcg tgagccactg	28380
tgctcggcct cagtgggtct ttcctttgag	tgacagttca atcctgtctc ttctgtag tg	28440
	eu	
tot gto acc tgo aaa too ggg gac	ttc agc tgt ggg ggc cgt gtc aac	28488
ser val thr cys lys ser gly asp	phe ser cys gly gly arg val asn	
45 50	55	
cgc tgc att cct cag ttc tgg agg	tgc gat ggc caa gtg gac tgc gac	28536
arg cys ile pro gln phe trp arg	cys asp gly gln val asp cys asp	

28581

aac ggc tca gac gag caa ggc tgt c gtaagtgtgg ccctgccttt
asn gly ser asp glu gln gly cys p

80

getattgage ctatetgagt cetggggagt ggtetgaett tgtetetaeg gggteetget cgagctgcaa ggcagctgcc ccgaactggg ctccatctct tgggggctca taccaagcct 28701 cttccgccct tcaaatcccc ccttgaccag gaggcattac aaagtgggga tggtgctacc 28761 tettegggtt tgteaegeae agteagggag getgteeetg eegagggeta geeaeetgge 28821 acacacactg gcaagccgct gtgattcccg ctggtcgtga tccccgtgat cctgtgatcc 28881 28941 ccgccccgtg aggctgaaca catagtgacg cttgctagcc aagcctcaat gacccacgta acatgaaggg ggaaaagcca gaaagttctg ccaaggagca aggccaagaa tcccgaaggg 29001 aaatggactt tgaagctggg cgtcttcttg gctgtcttaa tacaagtggc acatccaaat 29061 ccaaaacccc gaaattcaaa gtcttgagca cccgaaattc tgaaacgtct tgagcactga 29121 cctttagaag gaaatgctta ttggagcatt ttggatttcg gatttttacc actgagtgtg 29181 29241 gagtcctaat taggaaaaaa accaggctga ccgaaccaaa ggaaagcaat aaaagaaggc agatagggtc aggcacggtg gctcacccct gtaatcccag ccttttgaga ggctgaggcg 29301 ggtggatcac ttgaggtcag gagttcgaga gcagcctggc caacacggtg aaaccccatc 29361 tctactgaaa atacaaaaac tagccaggta tggtggcgtc tgcctgtaat cccagctact 29421 cgggaggctg agacaggaga atcacttgaa cctgggaggc agaggttgca gtgagccaat 29481 atcacgccat tgcactccag cctgggggac aagagcgaaa ttctgtctca aaaaaaaaga 29541 agaagaaggc cgacaaacta tgtaactctg cctttctcca tggtccagaa cacacagccc 29601 tectgegtaa ataacteett atetteetge teecagetat cateagacae eteggetgat 29661 agaaaattgc aagttagctc actgcaacct cggcattata agtactgcac aaagccctct 29721 teagegeaca geacaageae cattetataa aateteeage aageggeeag gtgeagtgge 29781 tcatacctgt aatcccagca ttttgggaga ctgaggcggg cggatcacct gaggtcagga 29841 gtttgagacc agcctggcca acatggtgaa accccgtctc tattaaaaat acaaaaaaat 29901 tagccaggcg tggtggcagg tgcctgtaat cccagctact tggaaggctg aggcaggaga 29961 atcgcttgaa cccgggaggt ggaagttgca gtgagccgag atcttgccat cgcactccag 30021 30081 ttgtcttctg gcagtcagct cctctcttgc tgacctgctc attgctttct tgcaaggtat 30141 tttcctacct actttctgga ataaatctgt ctttctgtac ttacaactac cttttttaaa 30201 atttetttet tttttgagat ggagteteae tetgtttgee eaggetggag tteagtggtg 30261 caatctcage teactgeaac etetacetac tgggttcaag egatteteet geeteagett 30321 cccgagtagc tgggattaca ggcgtgcacc agcacgcagg ctaatttttg tatttttagt 30381 agagacgggg tttcaccatg ttggccaagg tggtcttgaa ctcctgacct caagtgatcc 30441 tcccacctca gcctcccaaa gcgctaggat tacggccatg agccactgag gccggctgca 30501 cctacaactg tcttgataaa ttcttacccc cacaccactg gtccagatag tcagtgctca 30561 cccacaacat taaggatatt ccaaatttga aacattccaa aatcagaaaa atattccaac 30621

totgaaaata ttocaaaato caaaaaaatt caaaatocaa aacaottotg gtoccaagoa	30681
ttttagagaa gggatactca acccaaaata aggacagcaa ttctataaat tgtgctacca	30741
tettgeaggt eteagtttaa eagetttaea eetattageg eaceagtget eatageagtg	30801
ctgggaaatg tgtacagatg aggaaactga ggcaccgaga gggcagtggt tcagagtcca	39861
tggcccctga ctgctcccca gcccgccttt ccaggggcct ggcctcactg cggcagcgtc	30921
cccggctata gaatgggctg gtgttgggag acttcacacg gtgatggtgg tctcggccca	30981
tecatecetg cag ee eee aag aeg tge tee eag gae gag ttt ege tge	31029
ro pro lys thr cys ser gln asp glu phe arg cys	
85 90 95	
cac gat ggg aag tgc atc tct cgg cag ttc gtc tgt gac tca gac cgg	31077
his asp gly lys cys ile ser arg gln phe val cys asp ser asp arg	
100 105 110	
gac tgc ttg gac ggc tca gac gag gcc tcc tgc ccg gtg ctc acc tgt	31125
asp cys leu asp gly ser asp glu ala ser cys pro val leu thr cys	
115 120 125	
ggt ccc gcc agc ttc cag tgc aac agc tcc acc tgc atc ccc cag ctg	31173
gly pro ala ser phe gln cys asn ser ser thr cys ile pro gln leu	
130 135 140	
tgg gcc tgc gac aac gac ccc gac tgc gaa gat ggc tcg gat gag tgg	31221
trp ala cys asp asn asp pro asp cys glu asp gly ser asp glu trp	
145 150 155	
ccg cag cgc tgt agg ggt ctt tac gtg ttc caa ggg gac agt agc ccc	31269
pro gln arg cys arg gly leu tyr val phe gln gly asp ser ser pro	
160 165 170 175	
tgc tcg gcc ttc gag ttc cac tgc cta agt ggc gag tgc atc cac tcc	31317
cys ser ala phe glu phe his cys leu ser gly glu cys ile his ser	
180 185 190	
agc tgg cgc tgt gat ggt ggc ccc gac tgc aag gac aaa tct gac gag	31365
ser trp arg cys asp gly gly pro asp cys lys asp lys ser asp glu	
195 200 205	
gaa aac tgc g gtatgggcgg ggccagggtg ggggcggggc	31415
glu asn cys a	
210	
ctgtccctgg gctcccccag gtgtgggaca tgcagtgatt taggtgccga agtggatttc	31475
caacaacatg ccaagaaagt attcccattt catgtttgtt tcttttttt cttttctttc	31535
tttattttgt ttttgagatg gagtctcact ctgtgatttt tttcatctct aaatttccta	31595
catccatatg gccaccatga ggccccaggc tggccgatgg ttgctgttag cttattggga	31655

aatcactgtt tggaaggtgc tggttgtttt ttgttgtttg ttgtttttgt ttttgttttt	31715
gttttgagac ggagtctcgc tctgtcgcca gggtggagtg cagtggcgcg atcagctcac	31775
tgcaacctcc gcttcctggg ttcaagccat tctcctgcct cagcctccca agtagcgcgg	31835
attacaggca tgtgccacca cctccggcta tttttttttc tatttagtag agatggggtt	31895
tcaccatgtt agtcaggctg gtcatgaact cttgacctca ggtgatccac ccgcctcggc	31955
ctcccaaagt gctgggatta caggcgtgca ctgctgcacc cagccttttt ttgttttttt	32015
gagacagggt cttgctgtca cccaggttga agtaaggtgg cacgattatg gctcactgcg	32075
geettgatet eettggetea agegateete teaetteage eteteaagea gttggaacea	32135
caggetgtac caccaageet ggecaatttt tttgtacaga cacaggetgg tettgaacte	32195
ctgggctcaa gcaatcctcc tgccttggcc tcccaaagtg ctgggattcc aggcatgagc	32255
cgctgcaccc ggcaaaaggc cctgcttctt tttctctggt tgtctcttct tgagaaaatc	32315
aacacactet gteetgtttt eeag et gtg gee ace tgt ege eet gae gaa	32365
la val ala thr cys arg pro asp glu	
215	
ttc cag tgc tct gat gga aac tgc atc cat ggc agc cgg cag tgt gac	32413
phe gln cys ser asp gly asn cys ile his gly ser arg gln cys asp	
220 225 230 235	
cgg gaa tat gac tgc aag gac atg agc gat gaa gtt ggc tgc gtt aat	32461
arg glu tyr asp cys lys asp met ser asp glu val gly cys val asn	
240 245 250	
g gtgagegetg gecatetggt tttecatece ceattetetg tgeettgetg	32512
v ·	
cttgcaaatg atttgtgaag ccagagggcg cttccctggt cagctctgca ccagctgtgc	32572
gtctgtgggc aagtgacttg acttctcaga gcctcacttc cttttgtttt gagacggagt	32632
ctcgctctga cacccaggct ggagtgctgt ggcacaatca cagctcacgg cagcctctgc	32692
ctctgatgtc cagtgattct cctgcctcag cctcccgagt agctgagatt aaaggcgtat	32752
accaccacgc ccggctaatt ttttgtattt ttattagaga cagggtttct ccatgttggc	32812
caggetggte ttgaacteet ggteteaggt gateeaceeg eeteggeete eeaaagtget	32872
aggattacag gtgtgagcca ctgcgccagg cctaattttt ttgtattttt agtagagatg	32932
cggttttgcc atattgccca ggctggtctc gaactcctgg gctcaagcga tctgcctgcc	32992
ttggcctccc aaagtgctgg gattacaggc acaaaccacc gtgcccgacg cgttttctta	33052
atgaatccat ttgcatgcgt tcttatgtga ataaactatt atatgaatga gtgccaagca	33112
aactgagget cagacacace tgacetteet eetteetete tetggetete acag tg aca	33271
al thr	
ctc tgc gag gga ccc aac aag ttc aag tgt cac agc ggc gaa tgc atc	33219
leu cys glu gly pro asn lys phe lys cys his ser gly glu cys ile	

255 260 265

acc ctg gac aaa gtc tgc aac atg gct aga gac tgc cgg gac tgg tca 33267
thr leu asp lys val cys asn met ala arg asp cys arg asp trp ser
270 280 285
gat gaa ccc atc aaa gag tgc g gtgagtctcg gtgcaggcgg cttgcagagt 33319

asp glu pro ile lys glu cys g

290

ttgtggggag ccaggaaagg gactgagaca tgagtgctgt agggttttgg gaactccact ctgcccaccc tgtgcaaagg gctccttttt tcattttgag acagtctcgc acggtcgccc 33439 aggetggage geaatggege gatettgget caccacaace teeggeteee aggtteaage 33499 gattettetg ceteageete etgagtaget gggattaeag etgaatgeea eettgetggg 33559 ctaatttttg tatttttagt agagatgggg tttcaccatg ttggccaggc tggcctcgaa 33619 ctcctgacct cgagtgatct gcccgcctcc tgaagtgctg ggattacagg cgtgagccac 33679 ctcgtcctgg tgagggtttt ttttttccc caaccctctg tggtggatac tgaaagacca 33739 33799 tattaggata actgtacagt atagagaagg cagtggcaag ttttctctgt catataccag agtgggcttg ggcatggtgg catactcctg tagtctcagc taatcaggag gctgaggaag 33859 gaggateget tgggeeeagg agttggagae tgtagtgage tgtgateaea ceaceaeaet 33919 33979 tcaatctggg caacagagca agagacccta tctctaaaaa aaagtaagta tttcggacac tgtgggccat acggtctctg gtgcagtttc tcaacatggc tgttgggtga acacaaccac 34039 gcacagaacg caaaccaata cacgtggctg tgggcccaga aaatgttatt tatggacaca 34099 aaaattggaa tttcatataa ctgttttgtg tcatgaaaat gatttccctt tttattttta 34159 tttttcttct caagtattta aatatgtaaa agccattttt aggcctggca ggatggttca 34219 34279 cagctgtaat cccagcactt tgggaggtcg aggcgggagg atcacgaggt caggagatcg 34339 agaccatect ggecaacaca gtgaaacece gtetetaeta aaaatacaaa aaattaacea 34399 ggcttggtgg cgcgcgtctg tagtcccagc tgctcaggag gctgaggcag gagaatcgct tgaatgcagg aggcggaggt tgtagtgagc cgaggttgca ccactgcact ccagcctgag 34459 cgacagagtg agagtccgcc tcaaacaaaa aaatgtttgc ccatgctggt cttgaactcc 34519 tgggctcaag ctatctgcct gccttggtct cccaaagttc tgggattaca ggcatgagct 34579 acagegeeeg gaettttgtt gttttatate tatatateta tatataaett gttttatgta 34639 tatatataac ttgttttata tatatacata aactgcagta aaaaacatgt aacataaaat 34699 ttaccttctc aaaccttatt aagtgcacag ttctgtgcca ttagcaaatt cacactgttg 34759 34819 gagteteact egtegeaegg getggagtge agtggtgega teteggttea etgeaacete 34879 cacctaccag gttcaagcaa ttctcctgcc tcagccccct cagtagctgg gattacaggt 34939 gcccgtccta ccacgcccag ctaatttttg tattttcagt agagactgac tgggtttcac 34999 catgttggcc aggctggtct cgaactcctg acctcaagtg atcctcccac ctcagcctcc 35059 caaagtgctg ggaatacagg catgagccac tgcgcccggc cccagaactc ttttatcttc 35119 ccaaactgaa getetgteee catgaaacae teacteteea teeceteeee aacteetgge

acceaceatt ctactttctg teectatgaa tgtgatgget ctagggaeet cetetgagtg	35239
gaatcagaca gcattttcct tttttgactg gcttatttca ctgagccaag tgcggtggca	35299
cacgcctgta atcccaaaac tttgggagac cgaggcgggc gcatcaccag aggacaggag	35359
nncgagacca gcccggccaa cagggggaaa ccccatcact agggagcctg cagaaagaaa	35419
gccaccacat ggcctgctgg agccacacaa tcccagcaaa acagggacgc taaacgtagg	35479
agaaacacac aaccccagga ggcggaggtc gcagtgagcc gagatcgtgc cattacactc	35539
cagcctgggc aacaagagtg aaactccgtc tctcctaaaa atacaaaaaa attagctggg	35599
catggtggca catgcctgta gtcccagcta cttgggaggc tgaggcagga gaatcacttg	35659
aacccgggag gtggaggttg taatgagcca aggttggcgg cgaagggatg ggtaggggcc	35719
cgagagtgac cagtctgcat cccctggccc tgcgcag gg acc aac gaa tgc ttg	35773
ly thr asn glu cys leu	
295	
gac aac aac ggc ggc tgt tcc cac gtc tgc aat gac ctt aag atc ggc	35821
asp asn asn gly gly cys ser his val cys asn asp leu lys ile gly	
300 305 310	
tac gag tgc ctg tgc ccc gac ggc ttc cag ctg gtg gcc cag cga aga	35869
tyr glu cys leu cys pro asp gly phe gln leu val ala gln arg arg	
315 320 325 330	
tgc gaa g gtgatttccg ggtgggactg agccctgggc cccctctgcg cttcctgaca	35926
cys glu a	
tggcaaccaa acccctcatg cctcagtttc cccatctgtt aagtgtgctt gaaagcagtt	35986
aggagggttt catgagattc cacctgcatg gaaaactatc attggctggc cagagtttct	36046
tgcctctggg gattagtaat taagaaattt caggccgggt gcgtaatccc tgtaatccca	36106
acaccttggg acgccgaggc gggcagatca cctgaggtcg ggagttccag accagcctga	36166
ccaacatgga gaaaccccgt ctctactaaa aatacaaaat tagccgggct tggtggtgca	36226
tgcctataat cccagctact caggaggctg aggcaggaga atcacttgaa cctgggaggt	36286
ggaggttgtg gtgagccaag atcgtgccat tgcactccag cctgggcaac aagagtgaaa	36346
ctccatccaa aaaaaaaaga aaagaaaaga aaaaaaagaa aagaaatttc agctgacaca	36406
gcttcacact cttggttggg ttcccgtggt gaatgatgag gtcaggtgat gactggggat	36466
gacacetgge tgttteettg attacatete eegagagget gggetgtete etggetgeet	36526
tcgaaggtgt gggttttggc ctgggcccca tcgctccgtc tctagccatt ggggaagagc	36526 36586
tcgaaggtgt gggttttggc ctgggcccca tcgctccgtc tctagccatt ggggaagagc ctccccacca agcctctttc tctctcttcc ag at atc gat gag tgt cag gat sp ile asp glu cys	36586 36638
tcgaaggtgt gggttttggc ctgggcccca tcgctccgtc tctagccatt ggggaagagc ctccccacca agcctctttc tctctcttcc ag at atc gat gag tgt cag gat	36586 36638 gln asp

ccc gac acc tgc agc cag ctc tgc gtg aac ctg gag ggt ggc tac aag 36686 pro asp thr cys ser gln leu cys val asn leu glu gly gly tyr lys 340 350 355

tgc cag tgt gag gaa ggc ttc cag ctg gac ccc cac acg aag gcc tgc 36734 cys gln cys glu glu gly phe gln leu asp pro his thr lys ala cys 360 365 370

aag gct gtg g gtgagcacgg gaaggcggcg ggtgggggcg gcctcacccc 36784
lys ala val q

375

ttgcaggcag cagtggtggg ggagtttcat cctctgaact ttgcacagac tcatatcccc 36844 36904 tgaccgggag gctgtttgct cctgagggct ctggcagggg agtctgccgc cctgttagga 36964 cttgggcttg ccagggggat gcctgcatat gtcctagttt ttgggaatat ccagttaacg gaaccetcag cectactggt ggaacaggaa ceggetttee tttcagggac aacctgggga 37024 gtgacttcaa ggggttaaag aaaaaaaatt agctgggcat ggtgccacac acctgtggtc 37084 ccagctactc agaaggctga ggcgggagga ttgcttgagg gcaggaggat tggttgatcc 37144 37204 teccaectea geeteeggag tagetgggae eteaggtgea tgecaetatg eetggetaat 37264 tttetttttt etttttttt ttttttegag aeggagtete getetgttge eeaggetgga 37324 gtgcagtggc aggatetegg etcaetgeaa geteegeete eegggtteae gecattetee 37384 tgecteagee teeceagtag etgggaetae aggageeege caetgeacea ggecaatttt tttgtatttt tagtagagac ggggtttcac tgtgttagcc aggatggtct cgatctcctg 37444 37504 acttcgtgat ccgcccacct cggccttcca aagtgctcgg attacaggcg tgagccactg 37564 cgcccagccg ctaattttca tatttttagt aaaaacaggg tttcaccatg ttggccaggc 37624 tagtettgaa eteetgaace caagtgatee teetgeettg geeteecaaa gtgetgggat 37684 tacagacace acacetgget attattattt tttagagaca gggtgetget etatetteea gcctgtagtg cagtgcagcc tccatcatag ctcgctgcag ccttgacctc ctgggttcac 37744 37804 gtgatcgtcc cgcctaagcc tctggaggag ctgggagtac tggcatgtgc caccatgcct ggttaatttt ttttttttt tttttgagac agagtctcat tctgtcaccc aggctggagt 37864 37924 geggtggtgc gatettgget tactgaaacc tecacetece aggttecage aatteteetg 37984 cctcaccct ctgagtagct gggattacag gttccggcta ccaaacctgg ctagtttttg tatgtttagt agagacaggg tttcaccatg ttggtgaggc tggtctcgat tctcccgcct 38044 cagectecea aagtgetggg attacagget tgagecaceg tgeetggett ttttttttt 38104 tttttttttt gtggcaataa ggtctcattg tcttgcccag gctagcctta tgctcctagc 38164 ctcaagtgat cctcctccct cagcctccca aagtgctggg attacaggtg ggcgccactg 38224 tgcctgttcc cgttgggagg tcttttccac cctctttttc tgggtgcctc ctctggctca 38284 gccgcaccct gcaggatgac acaaggggat ggggaggcac tcttggttcc atcgacgggt 38344 cccctctgac cccctgacct cgctccccgg acccccag gc tcc atc gcc tac ctc 38399

ly ser ile ala tyr leu

375 380

ttc ttc acc aac cgg cac gag gtc agg aag atg acg ctg gac cgg agc 38447 phe phe thr asn arg his glu val arg lys met thr leu asp arg ser

				385					390					395		
gag	tac	acc	agc	ctc	atc	ccc	aac	ctg	agg	aac	gtg	gtc	gct	ctg	gac	38495
glu	tyr	thr	ser	leu	ile	pro	asn	leu	arg	asn	val	val	ala	leu	asp	
			400					405					410			
acg	gag	gtg	gcc	agc	aat	aga	atc	tac	tgg	tct	gac	ctg	tcc	cag	aga	38543
thr	glu	val	ala	ser	asn	arg	ile	tyr	trp	ser	asp	leu	ser	gln	arg	
		415					420					425				
atg	atc	tgc	ag g	gtgag	gegte	g co	ccctg	geetg	g cag	geett	ggc	ccgo	caggt	ga		38594
met	ile	cys	se													
	430															
gate	gaggg	get e	ctgg	cgct	gat	gece	ttct	ctcc	tcct	gc c	tcag	c a	cc c	ag c	tt	38649
												r t	hr g	ln l	eu	
														4	135	
gac	aga	gcc	cac	ggc	gtc	tct	tcc	tat	gac	acc	gtc	atc	agc	aga	gac	38697
asp	arg	ala	his	gly	val	ser	ser	tyr	asp	thr	val	ile	ser	arg	asp	
				440					445					450		
atc	cag	gcc	ccc	gac	999	ctg	gct	gtg	gac	tgg	atc	cac	agc	aac	atc	38745
ile	gln	ala	pro	asp	gly	leu	ala	val	asp	trp	ile	his	ser	asn	ile	
			455					460					465			
tac	tgg	acc	gac	tct	gtc	ctg	ggc	act	gtc	tct	gtt	gcg	gat	acc	aag	38793
tyr	trp	thr	asp	ser	val	leu	gly	thr	val	ser	val	ala	asp	thr	lys	
		470					475					480				
ggc	gtg	aag	agg	aaa	acg	tta	ttc	agg	gag	aac	ggc	tcc	aag	cca	agg	38841
gly	val	lys	arg	lys	thr	leu	phe	arg	glu	asn	gly	ser	lys	pro	arg	
	485					490					495					
gcc	atc	gtg	gtg	gat	cct	gtt	cat	gg g	gtgcg	gtato	cc ac	gac	gctga	a		38887
ala	ile	val	val	asp	pro	val	his	gl				•				
500					505											
ggg	etgea	iga g	ggaa	tgga	g gga	agca	ggaa	ggag	ctto	ag g	aact	ggtt	a gt	gggc	tggg	38947
cato	gtgg	jct c	aaag	cacc	t gta	aatc	ccag	cact	ttgg	ga g	gcca	aggt	a aa	tggai	tcat	39007
caag	jacca	igc c	tgac	caac	a tg	gtgaa	aacc	tcgt	ctct	ac t	aaaa	atac	a aa	aatta	agcc	39067
gggt	gtgg	gtg g	tggg	cacc	t gta	aatc	ccag	ctgo	tcgg	ga g	gctg	aggc	a gg	agaat	tcac	39127
ttga	acct	gg g	agat	ggag	g tt	gcagi	tgag	ccaa	gaca	ıgc c	ccac	tgca	c tc	cagc	ctgg	39187
gtga	caga	ıgt g	agac	tccg	t ct	caaaa	aaaa	aaaa	aaaa	aa c	taaa	caaa	a aa	ctggi	ttag	39247
tggd	taga	ıca a	cagg	atgg	t at	cttc	caag	ccca	tggc	tg a	ctca	gcag	c tc	ctgg	gtca	39307
agac	acto	jtg a	cctg	tgtc	c cci	tggca	agga	agca	tcgc	cc c	tgcc	acct	g cc	cggt	gtac	39367
tctc	tacc	tg t	cagg	tgac	a tc	tgcta	acct	aago	acgt	ga g	aggt	ggca	t tt	caca	gttt	39427

cagtgtggtg ctgacaaccc gggacgcaca ctgtccttgc agctacaatc aggaggtgaa	39487
tgttgggttt ccagcagaga acactggaga aggcacactt ggtgtctgga agggaaaagc	39547
agggaagaga gcatcatcag atgcctgcgg gtgaaggtgg gcccgctatg gccagcgtcc	39607
ctttttattt ttatttattt atttatttga gatggaatct cgctctgtcg cccagactgt	39667
agtgcagtgg tgcgatcacg gctcactgca agctccgcct cacaggttca cgccattctc	39727
ctgcctcagc ctcccgagta gctgggacta caggcacccg ccaccacgcc cggttaattt	39787
tttgcatttt tattagagac ggggtttcac cgcgttagcc aggatggtct aaatctcctg	39847
accetgtgat ceaceegeet eggeeteect aagtgettgg attacaageg tgageeacea	39907
cgcccggccc cctttttatt ttttattttt tgagacggag tctcgctctg tcgcccaggc	39967
tagattgcag tggcgtgatc tcggctcact gcagcctccg cctcccaggt tcaagtgatt	40027
ctcctgcctc aacctcccaa ctaattagga ttacaagcat gtaccaccat gcctgactaa	40087
ttttttgtat ttttagtaga gactgggttt caccatgttg gctaggctgg tctcgaaccc	40147
ttagcctcaa gtaatctgcc tgcctcagcc tcccaaacag cggggattac aggcatgagc	40207
cactgtgccc aacccaaccc tggatctctt ttaaacaaga caatgctcgc tgttgccaca	40267
gaacaatggg tggggtacat gtggcccagt gtgtttggcc acataactgc caggccagag	40327
ggaaagagac tctcagactg tctccactca gatacaaatg tgtgtgttgt gtgcgtgtgt	40387
tetggtetea tatttgtttg ttttgagaca gggtgteget etgteaetga gtetggagtg	40447
cagtggcgca atcagagttc actgcagcct caaactcttg ggctcagttg attctcccac	40507
ttcagcctcc caagtagctg gaactacagg tgaacaccac tgtgcccagc taatttattt	40567
tatttttagt agagatgagg teteactatg ttgeecagge tggtettgae etectageet	40627
caagcaatcc teetgeettg gteteccaaa gtgetgggat tacaegtgeg agceattgeg	40687
catggettgt gttettgtgt ttetteettt ttetttegag atggegtete agtetgeeae	40747
ccaggctgga gtgcagtggt gtgatcatag ctcactgtag cctcaacttc ctgggctcaa	40807
gcaatcetet tgattteage etecegggee tggecageat ggtgaaacce egtetetaet	40867
aaaaatacaa aaatgtagcc aggcgtggtg gtgggcgcct gtaatcccag ctacaccaga	40927
ggctgaggca ggagaatcgc ttgagcctgg aaggtggagg ttgcagcaag ccaagatcgt	40987
gccactgcac tccagcctgg gcaacagaga cagactctgt ctcaaaaaaa aaaaaaaaa	41047
acccaaacaa gccacatttg gagtttgggg ttcccagcag gactatttcc caagcctgag	41107
cctggctgtt tcttccagaa ttcgttgcac gcattggctg ggatcctccc ccgccctcca	41167
gcctcacagc tattctctgt cctcccacca g c ttc atg tac tgg act gac tgg	41220
y phe met tyr trp thr asp trp	
510 515	
gga act ccc gcc aag atc aag aaa ggg ggc ctg aat ggt gtg gac atc	41268
gly thr pro ala lys ile lys lys gly gly leu asn gly val asp ile	
520 525 530	
tac tcg ctg gtg act gaa aac att cag tgg ccc aat ggc atc acc cta	41316
tyr ser leu val thr glu asn ile gln trp pro asn gly ile thr leu	

535 540 545 g gtatgttcgc aggacagccg tcccagccag ggccgggcac aggctggagg 41367 acagacgggg gttgccaggt ggctctggga caagcccaag ctgctccctg aaggtttccc 41427 tctttctttt ctttgttttt tctttttttg agatgaggtc ttggtctgtc acccaggctg 41487 gagtgcactg gcgcaatcgt agctcactgc agcctccacc tcccaggctc aagtgatcct 41547 cctgcctcac cctcctgagt agctgagatt acagacacgt gccaccacgg cagactaatt 41607 ttattttatt tttgggaaga gacaaagtct tgttatgttg gcctggctgg tctcaaactc 41667 41727 agggtgcaag cgatcctccc gcctcagcct tccaaactgc tgggattaca ggcgtgggcc 41787 accgtaccca gcctccttga agtttttctg acctgcaact cccctacctg cccattggag 41847 agggcgtcac aggggagggg ttcaggctca catgtggttg gagctgcctc tccaggtgct tttctgctag gtccctggca gggggtcttc ctgcccggag cagcgtggcc aggccctcag 41907 gaccetetgg gactggcate ageaegtgae eteteettat ceaettgtgt gtetag 41963 42010 at ctc ctc agt ggc cgc ctc tac tgg gtt gac tcc aaa ctt cac tcc sp leu leu ser gly arg leu tyr trp val asp ser lys leu his ser 550 555 560 atc tca agc atc gat gtc aac ggg ggc aac cgg aag acc atc ttg gag 42058 ile ser ser ile asp val asn gly gly asn arg lys thr ile leu glu 570 42103 gat gaa aag agg ctg gcc cac ccc ttc tcc ttg gcc gtc ttt gag asp glu lys arg leu ala his pro phe ser leu ala val phe glu 580 585 590 gtgtggctta cgtacgagat gcaagcactt aggtggcgga tagacacaga ctatagatca 42163 ctcaagccaa gatgaacgca gaaaactggt tgtgactagg aggaggtctt agacctgagt 42223 tatttctatt ttcttctttc ttttttttt tttttttgag acagagtttt gctctcgttt 42283 42343 cccaggctgg agggcaatgg catgatctcg gctcaccgca acctccacct cccaggttca 42403 agtgattete etgteteagg etececagta getgggatta eaggeatgea ecaccaceat 42463 gcccggctaa ttttgtattt ttagtagaga cggagtttct ccatgttggt caggctggtc togaactcoc gacctcaggt gatctgootg cotoggootc ccaaagtgot gggattacag 42523 acttgagcca ccgcgcccag ctatttctgt tttctttctt tcttcttctt ctttttttt 42583 ttctaagaga caggatctca ctctgtcccc aggcaggagt gcagtgctgt gatcatagct 42643 cactgcagcc ttaacctcct gggctcaagt gatcttccca cctcagcctc ccaagtagct 42703 ggaactacag gtgcacacca ccatgcccag ctcatttttg tattttttt ttttttgaga 42763 cagtctcgtt ctgtcacccc ggctggagtg cagtggtaca atcttggctc actgcaacct 42823 ctgcctccca ggttcaagcg attctcctgc ctcagcctcc tgagtagttg agattacagg 42883 catgtgtgcc atcatacctg gctgattttt gtattttttt ttagagatgg ggtctcagta 42943

tgttgaccag gcttgtctta aactcccggc ctcaagtgat cctcccactt cagtctccca

43003

aagtgctggg attacaggca tgagccactg cggccggttt gttttctttt ttttttcgtt 43063 ttttggagac ggaatttcac ctttgttgcc caggatggag tgcaatggca cgatatcgcc 43123 tcaccacac ctctgcctcc tgggttcaaa ccattttcct gcctcagcct tcttagtagc 43183 43243 tgggattaca agcatgtgcc accacgcccg gctgattttg tatttttagt agagatgggg 43303 ttteteeatg ttggeeagge tggtetegaa eteetgaeet eaggteatte geeeaeetet gcctcccaaa gtgctgggat tacaggcgtg agccaccgtg cccggtggtt tgtattcttt 43363 ttactgagag tcgtgaaagg cagtgatcct ctgtcacatg tgatcttggc tctcagggga 43423 catttggcaa tttctagaga ttttttggtt gtcacaagtc aatggggaag actgttggca 43483 tttagtgggt agaggetggt gaegetgetg aacacccaga acagggaagt agcaggeeet 43543 agatagagcc atcgtgggga aaccctgctc taaggaaatg gcgctatttt ataaccccac 43603 gttcctggca tgattaccaa cagccaaaag tggagtcccc ccaagtgtgt tcgtccattt 43663 43723 gcattgcagt aaaggaatag ctgaggccgg gtaatttata aagaaaagag atttaaactg ggtatggcag tttatgccta taatcccaga actttgggag gctgaggcag gaggatcgct 43783 43843 tgagtccagg agtgtgagac cgagaccagc ctggccaaca tgacgaaact ctgtctctac aaaaaataca aaaagtaggc caggcacggt ggttcacgcc tgtaatccca gcactttggg 43903 aggccgaggc gggcggatca cgaggtcagg agatcgagac catcctggct aacacggtga 43963 aaccccgtct ctactaaaaa tacaaaaaca aaattagccg ggtgtggtgg caggcgcctg 44023 tagtcccagc tactcgggag gctgaggcgg gagaatggcg tgaacccggg aggcggagct 44083 tgcagtgagc caagatcgcg ccactgcact ccagcctggg tgaccgagtt gagactccgt 44143 ctcaaaaaaa aaaaaaaaa aaaaaataca aaaagtagcc aggtgtggtg gcaggcacct 44203 gtaateetgg gttetegaga eegaggeatg agaattgeet gaeeecagga ggtggagget 44263 gcagtgagec aagateatge caetgeaete cageetggge gacagagtgg gaetetgtet 44323 44383 caaaaaacaa caaaaaaaa gttctggaaa tggatggtgg tgatggtgat acttccacaa 44443 cagcgtgaat ctgcttaagg ccaccgaact gtgcactcac aaatagtcga gatggtacat 44503 tttatgttat gtgtatttca ccacaattaa aaactagttg tgggccaggt gtggttgttc atgeetgtaa teecageaet ttgggaggte agagggaggt ggateatgag gteageagtt 44563 cgagaccage caggecaaca tggtgaaace ceatetetae taaaaataca aaaattagee 44623 aggegtggtg geacatgeet gtagteecag etaettgaga ggetgaagea ggagaatege 44683 ttgaacctgg gaggctaaga ttgcagtgag ccgagatcgt gccactgcac tccagcctgg 44743 acgacagagt gagacttcgt ctcaaaaaaa aaaccaaaaa aaaaattagc tgtgggtcag 44803 gcactgtggc tcacgcctgt aatcccagca ctttgggaga ccgaggtagg tggatggcct 44863 gaggtcagga gttcgaatcc agcctggcca acatggtgaa agcccgtctc tactaaaaat 44923 acaaaaaatt agtcaggtat gttggcacac ctgtaatccc agctactcgg gaggctgaag 44983 caagagaatc gtttgaaccc aggaggtgga cgttgcagtg agccgagatt gggccactgt 45043 actccagcct gggcaacaaa agtgaaactc tgtctgaaac aaacaaacaa acaaacaaac 45103 agacaaacaa aaaaactagt tgtggagaga gggtggcctg tgtctcatcc cagtgtttaa 45163 cgggatttgt catcttcctt gctgcctgtt tag gac aaa gta ttt tgg aca gat 45217

asp lys val phe trp thr asp	
595 600	
atc atc aac gaa gcc att ttc agt gcc aac cgc ctc aca ggt tcc gat	45265
ile ile asn glu ala ile phe ser ala asn arg leu thr gly ser asp	
605 610 615	
gtc aac ttg ttg gct gaa aac cta ctg tcc cca gag gat atg gtt ctc	45313
val asn leu leu ala glu asn leu leu ser pro glu asp met val leu	
620 625 630	
ttc cac aac ctc acc cag cca aga g gtaagggtgg gtcagcccca	45358
phe his asn leu thr gln pro arg g	
635 640	
ccccccaac cttgaaacct ccttgtggaa actctggaat gttctggaaa tttctggaat	45418
cttctggtat agctgatgat ctcgttcctg ccctgactcc gcttcttctg ccccag	45474
ga gtg aac tgg tgt gag agg acc acc ctg agc aat ggc ggc tgc cag	45521
ly val asn trp cys glu arg thr thr leu ser asn gly gly cys gln	
645 650 655	
tat ctg tgc ctc cct gcc ccg cag atc aac ccc cac tcg ccc aag ttt	45569
tyr leu cys leu pro ala pro gln ile asn pro his ser pro lys phe	
660 665 670	
acc tgc gcc tgc ccg gac ggc atg ctg ctg gcc agg gac atg agg agc	45617
thr cys ala cys pro asp gly met leu leu ala arg asp met arg ser	
675 680 685	
tgc ctc aca g gtgtggcaca cgccttgttt ctgcgtcctg tgtcctccaa	45667
cys leu thr g	
690	
ctgccccctc ctgagcctct ctctgctcat ctgtcaaatg ggtacctcaa ggtcgttgta	45727
aggactcatg agtcgggata accatacttt tcttggatgg acacatcagc accgggcttg	45787
acatttaccc agttcccctt tgatgcctgg tttcctcttt cccggccccc tgaagaggtg	45847
atctgatttc tgacaggagc cctgagggag gaaatggtcc cctttgttga cttttctttt	45907
tctttatttt tttcttttga gatttgctgt cacccagcct ggaatgcagt ggtgccatct	45967
tggctcactg ctacctctcc cactgggttc aagcaattct cctgcctcag cctcccaagt	46027
agctgggatt acaagcatgc gccaccatgc ctggctaagt tttgtatttt tagtacagac	46087
agggtttctc catggtggcc aggctggtct tgaactcctg acctcaggtg atcctcccac	46147
ctctgcctcc cgaagtgcta cgattacagg catgagccac cgcgcccatc cccctttgtt	46207
gacttttctc atcctctgag aaagtctcag ttgaggccag cacctccctc aagtgaattg	46267
aatctccctt ttgaacaaca acaaataaca atatgaccca gacgtggtgg ctcacacctg	46327
tggtcccagc tactcgggag gctgaggtgt gaggattgct tgagcccagg aggtcaaggc	46387

tacagagagc	tataatcaca	ccacttcact	ccagcctggg	ggacaaagtg	aaaccctgtc	46447
tgaaaaaaac	aaaaaagaa	aaaggaaaaa	gaaacaatac	gatcacaaag	tagatattca	46507
tagtgtttat	tttcagtact	cttttttt	tttttttt	tttttgagac	ggagtcttgc	46567
tctgttgccc	aggctggagt	gcagtggcac	gatcttggct	cactgcagcc	tctgcctccc	46627
aggttcaagc	gcttggctca	ctgcaacctc	cgcctcctgg	gttcaagcgc	ttcttctgcc	46687
tcagcctccc	cagtagctgg	gactataggc	acgtcccact	acgcccagct	aattttttgt	46747
attttttagt	agagatgggg	tttcactatg	ttagccagga	tggtctcgat	ctcctgacct	46807
cgtgatctgc	ctgccttggg	ctcccaaagt	gttgggatta	tgggcatgag	ccactgcacc	46867
tggccttttt	tttttttt	tttgagatgg	agtttcgctc	ttgttgccca	ggctggagtg	46927
caatggtgtg	atctcggctc	actgcaacct	ctgcctcctg	ggttcaagca	attctcctgc	46987
ctcagcctcc	cgagtagctg	ggattacagg	cacctgccac	cacgcctggc	taatttttgt	47047
acttttagta	gagacggggt	ttctccatgt	tggtcaggct	ggtctcaaac	tcctgacctc	47107
aggtgatcca	cccacctcgg	cctcccaaag	ttctgggatt	acagacatga	gccaccgcgc	47167
ctggccgtgt	ctggcctttt	ttagttattt	cttttttt	tttttttt	tttgagacag	47227
agtcttactc	cgtcgcccag	gctggagtgc	agcggtgcga	tgtctgcgca	ctgcaagctc	47287
cgccccctgg	gttcatgcca	ttctcctgcc	tcagccttct	gagtagctgg	gactgcaggc	47347
gcctgccact	acgcccggct	acttttttgt	atatttagta	gagatggagt	ttcactgtgt	47407
tagccaggat	ggtctcgatc	tcctgacttt	gtgatccgcc	cgcctcggcc	tcccaaagtg	47467
ctgggattac	aggcgtgagc	caccatgcca	ggctttttt	tttttttt	tttttgagac	47527
ggagtettge	tctgtcgccc	aggctggagt	gcagtgccat	gatctcagct	cactgcaagc	47587
tccacttccc	agġctcacgc	cattctccag	cctcagcctc	ccaagtagct	gagactacag	47647
gggcccgcca	ccacactcgg	ctaattttt	tgtattttta	gtagagacgg	ggtttcacca	47707
tgttagccag	gctggtcttg	aactcctaac	ctcaggcgat	tcacctgcct	cggcctccca	47767
aagtgctggg	attaaaggta	tgagccacct	cgcctggtgt	gagccacctc	gcccagcctg	47827
agccacctca	cccagcctaa	gccactgtgc	ctggcctgat	tttggacttt	ttaaaaattt	47887
tattaataat	tatttttggg	tttcttttt	ttgagacagg	gtcttactct	gtcatccagg	47947
ccatcctgtc	tgtctgtcat	cccagtgatg	ggatcatacc	ttgctgcagc	ctctacctcc	48007
tgggctcaag	cgatectece	ccctcagcct	cctgagtagc	tgggagtaca	ggtgtgcacc	48067
accacacctg	gctaattttt	tttttttt	ttgtatatag	agatggtatt	ttgccatgtt	48127
gaccaggcta	gtcttaaact	cctggactca	ctcaagagat	cctcctgcct	tggcctccca	48187
aggtcatttg	agactttcgt	cattaggcgc	acacctatga	gaagggcctg	caggcacgtg	48247
gcactcagaa	gacgtttatt	tattctttca	g ag gct ga	ag gct gca	gtg gcc acc	48301
			lu ala gl	lu ala ala	val ala thr	
			69	95	700	

cag gag aca tcc acc gtc agg cta aag gtc agc tcc aca gcc gta agg 48349 gln glu thr ser thr val arg leu lys val ser ser thr ala val arg

705 710 715

aca cag cac aca acc acc cga cct gtt ccc gac acc tcc cgg ctg cct 48397 thr gln his thr thr thr arg pro val pro asp thr ser arg leu pro 720 725 730 ggg gcc acc cct ggg ctc acc acg gtg gag ata gtg aca atg tct cac 48445 gly ala thr pro gly leu thr thr val glu ile val thr met ser his 735 caa g gtaaagactg ggccctccct aggcccctct tcacccagag acgggtccct 48499 gln a 750 48559 teagtggcca cgaacatttt ggtcacgaga tggagtccag gtgtcgtcct cactcccttg ctgaccttct ctcacttggg ccgtgtgtct ctgggccctc agtttcccta tctgtaaagt 48619 gggtctaata acagttcttg ccctctttgc aaggattaaa tgggccaaat catatgaggg 48679 gccaggtcct tcaggctcct ggttcccaaa gtcagccacg caccgtgtgg gtcccaaaat 48739 tttatcaagg cacattegtt geeteagett caggeatetg eecaaaaagg eeaggaetaa 48799 ggcaaggaga gggagggatt cctcagtact cagcttttca cagaggctcc aaaaggctaa 48859 ggaatccagt aacgttttaa cacaatttta caatttttt ttttgagacg gagttttgct 48919 cttgttgccc aggctggagt gcagtggcac gatctcggct cactgcaacc tctggctccc 48979 49039 gggttcaagc gattctcctg cctcagtctc ccgagtagct gggattacag gcatgcgcca ccacgctcgg ctaattttgt atttttagta cagaaggggc ttctctgttg gtcaggctgg 49099 49159 tegtgaacte teaaceteag gtgageeace egeetgagee teecaaagtg etgggattae aggtgtgage caccaegeet ggeetttttt ttgagacaga gtetegetet egeecatget 49219 gtactgcagt gacgcagtct gggctcactg taacctccgc ttcccaggtt caagtgattc 49279 ttctgccgca gcctcccatg tagagtagct gggattacag gcacccgcca ccatgcctgg 49339 ctaattcttg catttttagt agagatgggg tttcacagtg ttggccaggc tggtctcaaa 49399 cttctgacct caagtcatct gcctgccttg gccctgccaa agtgctggga ttatagatgt 49459 gagecacege geetggeeta cagtttatte tttggtgget cacacetgta ateteageae 49519 tttgggaggc caaggtggga gaatggcttg agcccaggag ttcaagtcca gcctgggcaa 49579 49639 catagcaaga ccctatctct actacaaaat aaataataaa taaactaatt ttttttcttt taaaacccaa ctattcaaca tggcaatgca atatattaaa aaaatttttt ttttctttga 49699 aacggagtet eteactgtea eeegggetgg agtgeagtgt egecatettg geteactgea 49759 accteegeet eeeaggteea agtgattete etgetteage etecegagta getgggatta 49819 caggcaccca ccaccatacc cagctaatat ttttgtattt ttagtagaga tggggtttca 49879 49939 ctatgttggg caggctggtc tggaactcct gacctcgtga tctgcccgag gatcggcggc ctcccaaagt gctggggatt gcaggcatga gccaccgtgc ccagccaaaa cttttttatt 49999 tttatttttt tgggacacgg tctcactgtg taccccagac tggagtgata gagtgctgtc 50059

atggeteact geageeteaa eeteeetggg eteaggtgat etteetgett eagteteeea

ggtagctggg actacaggca tgagccacca cacccagcta atttttgaat ttttttgtag

50119 50179

agacagggtt tcaccttgtg gcccagactt gtctctaact ccagggctca agcgatctgc 50239 ccaccttggc ctcccaaagt gctgagatta atgcaattta aaaaattttt tggccaggcc 50299 tggtggctca tgcctgtatt cacaacacct tgggaggcaa aggtgggcag atcacttgag 50359 gtcaggagtt cgagactagc ctggccaaca tggtgaaacc ccctgtctac taaaaaaata 50419 50479 caaaaattac ctgggcacag tggtgggtgc ctgtaatccc agctacttgg gatgctgagg gtggagaatt gcttgaacct gggaggcaga agttgcagta agccaagatc atgccactgg 50539 actccagcct cagtgacaga gcaaaactct gtctccaaaa aaattgtttt tttttttt 50599 ttttcaaatc atcacactac agccaaggcc tggccactta cttttgtaaa taaagtttta 50659 50719 ttggagccag tggaccagtg aggccgaatc ttgcaggtgt aagatcacag tctatccttg 50779 aaaattttga tattttgttc attgggtggt ttttcattaa tttaaatttt aaaaaataac atattaaagg ctggtgtgga ggtgcacgcc tgcagtccta gctactccca gaggctgagg 50839 cgggagactt gcttgagccc aagagttgaa gtccagcctg ggcaacatag cgagaccccc 50899 atctctaaaa ataaaaataa tgcattagaa tattattgga ttcctgggca gggcacagtg 50959 gctcacacct gtaatcccag cactttggga ggctgaggtg ggtggatcac ctgaggtcag 51019 51079 gagtttgaga ccagcctggc caacatggtg aaaccccgtc tctactaaaa atacaaaaat 51139 tagccaggcg tggtggcagg tgcctgtaat cccagctact cgggaggctg aagcacgaga atcgettgaa tecaggagge ggaggttgea gtgagetgag attgegeeat tgeacteeag 51199 cctggaggac aagagtgaaa ctccattccc ctctgcaaag aaaaggaata ttatcagatt 51259 51319 cctaagettt ttggeteece etttagtttg ggggetgggg tggtgagtgt etgaeetgge 51379 ctcactgtcc tccctggatg tgatgagacc caggtgtggg tcaggatgtc attcgtttgt 51439 ccaccagagg gcgcccaaac tgctttgagc tgctgggaaa tggtgctcct agacttttag 51499 caaacaaaca aaaaaaaatg gcacatcggc aaatttcaga ccattcttt tttttttt tttggttcca gagtagctga aatctttgtt cagttacaag caggataaaa tggaaactgc 51559 ctgggagagg ctgagaaacc ttcttgcttg ggggaggtgg ggcactgcta gaattaatcg 51619 cttcacagac cagcccatcc aggactcctc aaatttggca aaaaagccat tcattcattc 51579 51739 attcatttat gtagagacga gggggatctg gctatattgc ctagattggt ctcaaattcc 51799 tggcctcaag tgatcctcct gccttggtct actaatgtgc tgcgattaca ggcatgagcc 51859 acceptecta getetagteg acttgaaate ttecettece caeegecett atetteaate 51919 geocaggice actigitatgg tietgiacea aggitaacee cateceataa tgeetgggae agttgatgca ggacaatcag cttctgtgcc attcaacctc aggactgagc atgctgggca 51979 52039 ttgtggggtc cgaaggtggc tcccctgtcc ccttcaaaat accctctttt tctttcttc ttttttttt tttttttt ttgagacgaa gtcttgctct gttgccccag ctagagtgca 52099 gtggtgcgat ctcagctccc cgcaacctct gcttcccggg ttcaggcgat tctcctgcct 52159 cagectectg agtagetggg attacaggtg eccacegeca cagetggeta atttttgtat 52219 ttttagtaga gacagggttt caccgtgttg gccaggctgg tcttgaactc ctgacctcag 52279 gcaacctgcc cacctcagcc tcccaaagtg ctgggattac aggtttgagc cactgggcct 52339 ggcctttttt ttttttttt gagagggagt ctcactctgt tgcccaggct ggagtgcaat 52399

ggcgcgatct tgactcactg caactccatt tcccgggttc aagtgattct cctccctcag	52459
cctcccaagt agctgggatt acaggtgcat gccaccacgg ccagctaatt ttgtattttt	52519
agtagagaca gggtttcact atgttgatca tgctggtctc aaactcctga ccttaggtga	52579
tetgecegee ttageeteee aaagtgttgg gattacaggt gtgageeace gegeeeagae	52639
caaaatatgc tcattttaat aaaatgcaca agtaggttga caagaatttc acctgcaacc	52699
ttgtcaacca cctagaataa aagcctctgc agccctcccc taaagactca tcaatgtgag	52759
getcaagaac ettettagge tgggeteggt ggetcattte tgtaateeet geaetttgga	52819
aggctgaggc aggaggatct cttgaggcca ggagttcaag acaagcctgg gcaacatagc	52879
cagacetetg tttetatece ceacaaaaag aacettetta aaceggaatt gagteetaca	52939
acctcgataa ctcacaaata agcccgtgtg gcctctcaca gacttgggaa gttctccaag	52999
tgtccaggga gatgtgccag gcgctttcct gccgtgacca ccgtcctctg cctgctccat	53059
ttcttggtgg ccttccttta gacctgggcc tcactcttgc ttctctcctg cag ct ctg	53117
la leu	
750	
ggc gac gtt gct ggc aga gga aat gag aag aag ccc agt agc gtg agg	53165
gly asp val ala gly arg gly asn glu lys lys pro ser ser val arg	
755 760 765	
gct ctg tcc att gtc ctc ccc atc g gtaagcgcgg gccggtcccc	53210
ala leu ser ile val leu pro ile v	
770 775	
cagegteece caggteacag cetecegeta tgtgaceteg tgeetggetg gttgggeetg	53270
ttcacttttt ctcctggaca gggaacagcc ccactggtgt cctttatcac ccccacggcc	53330
tctcctggct tggggctgac agtgacaaga tcagacagct aaggggtcag atggaggatg	53390
tggagetggg tecegtgetg tggaatagee teacegagat ttgagtgeet tetggggaae	53450
tggttccctt gcagggggct gtgtggagag gcgcgctctc cctgcctcac ccatgctcat	53510
cctaactcgg ttaccatcac atctctttt tcttttttc ttaaatttta agaaaaaaga	53570
aatttaattt ttttgagaga cagagtettg etetgteace caggetggag tgeagtggea	53630
ccatcatgcc tcgctgcagc ctcaatgtct gggctcaagc gatcctccca cctcagcctc	53690
ctgagtagct ggtgcaagcc actatacccc acttcctatt tcttaaaaag tcacagccct	53750
gtgtgtggct aatcctggac agaaatctag aagaagtcag ctacttctgg ggcgtggctc	53810
acccagtggg cttcaggtta gatatttctt atacttatga ggctgggtgt ggtggcttat	53870
gcctgtaatc ccagcacttt gggaggctga agtgggtgga ttgcttgggc tcaggagttc	53930
gagaccaacc tgggcaacat ggcgaaaccc tgtttctaga aaaggtacaa aaattagctg	53990
ggcaggtggc acgtgcctgt ggtaccagct acttgagggc ctgaggcagg aggatcgctt	54050
gaacctggga ggtcgaggtt gcagtgaact gagatcatgt cactgcactc cagcctggtg	54110
acagagcaag accccgtctc aaaaaaaaa aaagaaagaa aaaaattctt atgcatagat	54170
ttgcctcttt tctgtttgtt tgttttgaga tggagtctcg ctctgtcgcc caggctggag	54230

tacagtggct caacetegge teactgeaac etetgeetee egggtteaag caatteteet	54290
gcctcagcct cctgagtagc tgggactaca gcgcccgcca ccatgcccag ctaatttttg	54350
tatttttagt agagactgac tgggtttcat catgttggcc aggctggtct cgaactcttg	54410
aceteatgat eegeeegeet eageeteeca aaatgetggg attacaggeg tgagecacea	54470
ggcccaggcc gcaaggcgat ctctaaacaa acataaaaga ccaggagtca aggttatggt	54530
acgatgcccg tgttttcact ccagccacgg agctgggtct ctggtctcgg gggcagctgt	54590
gtgacagage gtgcetetee etacag tg ete ete gte tte ett tge etg ggg	54642
al leu leu val phe leu cys leu gly	
780	
gtc ttc ctt cta tgg aag aac tgg cgg ctt aag aac atc aac agc atc	54690
val phe leu leu trp lys asn trp arg leu lys asn ile asn ser ile	
785 790 795 800	
aac ttt gac aac ccc gtc tat cag aag acc aca gag gat gag gtc cac	54738
asn phe asp asn pro val tyr gln lys thr thr glu asp glu val his	
805 810 815	
att tgc cac aac cag gac ggc tac agc tac ccc tcg gtgagtgacc	54784
ile cys his asn gln asp gly tyr ser tyr pro ser	
820 825	
ctctctagaa agccagagcc catggcggcc ccctcccagc tggaggcata tgatcctcaa	54844
gggaccaggc cgaggcttcc ccagccctcc agatcgagga cagcattagg tgaatgcttc	54904
tgtgcgctca ttcagaatgt cagcggacaa tggccttggt ggtgtagagg aatgttggat	54964
aagcaaatag agagctccat cagatggtga cagggcaaag aaagtcaaaa ggagttcaga	55024
ggeegggege ggtggeteat geetgtaate eeaggaettt gggaggeega ggetggegga	55084
tcacctgaag tcaggagttt gagaccagct tggccatcat gacaaaaccc cgtctctatt	55144
aaaaatacaa aaaattagcc aggcgtggga gtgggcgcct gtaatcccag ctactcggga	55204
ggccgaggta gaaaaatcgc ttgaacctag gaggcagagg ttgcagtgag ccgagatcgc	55264
gccactgcat tccagcccgg gaggcaagag caaaactcca tctcaaaaaa aaaaaaaaa	55324
ggagttcaga ggcccggcat ggtggttcac acatgtgatc ccagaacttg gggaggttga	55384
ggcaggagaa tcacctgagc tcagagttca agaccagcct gggcagcaca gcaagacccc	55444
atctctgcaa aaaataaaaa tttagcccag tgtggtgatg agcgcctagt tccagctact	55504
agggaggcta aggcaggagg attgcttgag gctaaggtag gagattgaga ctgcagtgac	55564
ttgtgattge gtcactgege tecageetgg gtgacagage aageeettgt etettaaaaa	55624
aaaaaaaaaa ttcaaagaag ggtttccaga gggccaggag ggaggaaggg agaggaggtg	55684
ttttattttt ttgcttttat tttttatttt gagacagagt ctctctctgt cacccaggtt	55744
ggagtgcagt gctgtgatct tggctcactg caacttctgc ctcctgggtt caagcaattc	55804
ttatgcctca gcctcagcct cctgagtagc tgggattaca acactatgcc cgggtaattt	55864
ttgtattttt agtagagacg aggtttcgcc atgttgccca gactggtctc gaactcctga	55924

cctcaagtga tccacccgcc ttggcctccc cacgtgctgg gattgcaggc gtgagcca	ct 55984
gcgcccgcct tgatctttac acaaggggtt tagggtaggt agccttctct gaaccagg	gag 56044
aacageetgt gegaaggeee tgaggetgga eegtgeetgt tgggtttgag geegttgt	ag 56104
ctggagcaaa cagagagagg ggtaaaaagg caggaggcta ccaggcaggt tgtgcaga	gc 56164
cttgtgggcc actggggagg actttggctt ttgccctgag agcggtggga agtgactg	jaa 56224
teeggtaete acceteteee tetggegget eetgggggaa catgettggg gateagge	tg 56284
ggggaggetg ccaggeccag gaggtgagaa gtaggtggee tecageegtg ttteetga	at 56344
gctggactga tagtttccgc tgtttaccat ttgttggcag aga cag atg gtc ag	56399
arg gln met val se	r

ctg gag gat gac gtg gcg tgaacatctg cctggagtcc cgtccctgcc 56447 leu glu asp asp val ala

830

835 839

56507 cagaaccett cetgagaeet egeeggeett gttttattea aagacagaga agaccaaage attgcctgcc agagctttgt tttatatatt tattcatctg ggaggcagaa caggcttcgg 56567 56627 aagagaaaca ggcccggggg gaccaggatg acacctccat ttctctccag gaagttttga 56687 56747 gtttctctcc accgtgacac aatcctcaaa catggaagat gaaaggggag gggatgtcag 56807 gcccagagaa gcaagtggct ttcaacacac aacagcagat ggcaccaacg ggaccccctg gccctgcctc atccaccaat ctctaagcca aacccctaaa ctcaggagtc aacgtgttta 56867 56927 cctcttctat gcaagccttg ctagacagcc aggttagcct ttgccctgtc acccccgaat 56987 catgacccac ccagtgtctt tcgaggtggg tttgtacctt ccttaagcca ggaaagggat tcatggcgtc ggaaatgatc tggctgaatc cgtggtggca ccgagaccaa actcattcac 57047 caaatgatgc cacttcccag aggcagagcc tgagtcactg gtcaccctta atatttatta 57107 57167 agtgcctgag acacceggtt accttggccg tgaggacacg tggcctgcac ccaggtgtgg etgteaggae accageetgg tgeecateet eccgaeecet acceaettee atteeegtgg 57227 teteettgea ettteteagt teagagttgt acaetgtgta eatttggeat ttgtgttatt 57287 57347 57404 gtcaatgaat gccggggaca gagaggggca ggttgaccgg gacttcaaag ccgtgatcgt 57467 gaatatcgag aactgccatt gtcgtcttta tgtccgccca cctagtgctt ccacttctat gcaaatgcct ccaagccatt cacttcccca atcttgtcgt tgatgggtat gtgtttaaaa 57527 57587 catgcacggt gaggccgggc gcagtggctc acgcctgtaa tcccagcact ttgggaggcc gaggcgggtg gatcatgagg tcaggagatc gagaccatcc tggctaacac gtgaaacccc 57647 57707 gtctctacta aaaatacaaa aaattagccg ggcgtggtgg cgggcacctg tagtcccagc tactcgggag gctgaggcag gagaatggtg tgaacccggg aagcggagct tgcagtgagc 57767 cgagattgcg ccactgcagt ccgcagtctg gcctgggcga cagagcgaga ctccgtctca 57827 aaaaaaaaaa acaaaaaaaa accatgcatg gtgcatcagc agcccatggc ctctggccag

gcatggcgag gctgaggtgg gaggatggtt tgagctcagg catttgaggc tgtcgtgagc 57947 tatgattatg ccactgcttt ccagcctggg caacatagta agaccccatc tcttaaaaaa 58007 58067 tgaatttggc cagacacagg tgcctcacgc ctgtaatccc agcactttgg gaggctgagc 58127 tggatcactt gagttcagga gttggagacc aggcctgagc aacaaagcga gatcccatct 58187 ctacaaaaac caaaaagtta aaaatcagct gggtacggtg gcacgtgcct gtgatcccag ctacttggga ggctgaggca ggaggatcgc ctgagcccag gaggtggagg ttgcagtgag 58247 ccatgatcga gccactgcac tccagcctgg gcaacagatg aagaccctat ttcagaaata 58307 caactataaa aaaataaata aatcctccag tctggatcgt ttgacgggac ttcaggttct 58367 58427 ttctgaaatc gccgtgttac tgttgcactg atgtccggag agacagtgac agcctccgtc 58487 agactcccgc gtgaagatgt cacaagggat tggcaattgt ccccagggac aaaacactgt 58547 gtcccccca gtgcagggaa ccgtgataag cctttctggt ttcggagcac gtaaatgcgt ccctgtacag atagtgggga ttttttgtta tgtttgcact ttgtatattg gttgaaactg 58607 58667 cctggttgct gtatttgttc agtgactatt ctcggggccc tgtgtagggg gttattgcct 58727 58787 ctgaaatgcc tcttctttat gtacaaagat tatttgcacg aactggactg tgtgcaacgc 58847 tttttgggag aatgatgtcc ccgttgtatg tatgagtggc ttctgggaga tgggtgtcac tttttaaacc actgtataga aggtttttgt agcctgaatg tcttactgtg atcaattaaa 58907 tttettaaat gaaccaattt gtetaaaete gatgeaegtt ettetgtteg egegettett 58967 59027 tttgtttttt tttttttcct gagatggagc ctggctctgt cacccctggc tggagtgcag tggcatgate teggettaet geaageteeg eeteecaggt teaageaatt eteetgeete 59087 59147 agceteceta gtagetagga ttacaggtga gtgecaceae geetggeeaa tttttttttt 59207 tttttttttt ttgagacaga gtctcgctct gtcacccagg ctggagtgca gtggtgtgat ctcggctcac tgcaagctct gcctcccagg ttaatgccat tctcctgtct cagcctcctg 59267 59327 agtagctggg gccacaggcg cctgccacca cgcccggcta atttttttt gtacttcttt 59387 tagtacagac ggggtttcac catgttagcc aggatggtct cgatctcctg accttgtgat ccacctgctt cggcctccca aagtgctgag attacaggcg tgagccaccg cgggtggcca 59447 acgetaattt ttttgttttt ttagatggag tettgetetg tegeecagge tggagtgeag 59507 tggcgtgatc tctgcctact gcaagctccg cctcccgggt tcatgccatt ctcctgcctc 59567 59627 agecteetga gtaactggga etacaggeae eegecaceae geeeggetaa ttttttgtat ttttagtaga gacagggttt caccgtgtta gccaggatgg tcttgatctc ctgaccttgt 59687 gatecaeceg teteggeete ecaaagtget gggattagag gtgtgageea ecaeacetgg 59747 cctagcctgg ctaatttttg tatttttggt agagacgggg tttcaccatg ttggtcaggc 59807 tggtcttgaa cttctgacct caggtaatct gcctgcctca gtctcccaaa gtgctgggat 59867 tacaggtgtg agccaccgcg cctggcctca cttccttctg tcatctgttt gtggattgga 59927 ctccccagga gaaggaccca gaaggggaag actcccagaa ctccgggcaa gatgcaatct 59987 60000 ccgtgggctg cca

<210> SEQ ID NO.: 2

<211>24

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex1F

<400>

cacattgaaa tgctgtaaat gacg

<210> SEQ ID NO.: 3

<211>24

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex1R

<400>

ctattctggc gcctggagca agcc

<210> SEQ ID NO.: 4

<211>24

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex2F

<400>

ttgagagacc ctttctcctt ttcc

<210> SEQ ID NO.: 5

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex2R

<400>

gcatatcatg cccaaagggg

<210> SEQ ID NO.: 6

<211>24

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex3F

<400>

ttcctttgag tgacagttca atcc

<210> SEQ ID NO.: 7

<211>24

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex3R

<400>

gataggctca atagcaaagg cagg

<210> SEQ ID NO.: 8

<211>24

<212> polynucleotide

<213> artificial sequence

```
<220>
```

<221> oligonucleotide

<223> Mut191-2F

<400>

acagttcaat cctgtctctt ctct

<210> SEQ ID NO.: 9

<211>10

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex4AF

<400>

gtggtctcgg ccatccatcc

<210> SEQ ID NO.: 10

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex4ARF

<400>

agccatcttc gcagtcgggg

<210> SEQ ID NO.: 11

<211>12

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Mut 509insCR

<400>

cgagccatct tcgcagtcgg ag

<210> SEQ ID NO.: 12

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex4BF

<400>

ccccagctg tgggcctgcg

<210> SEQ ID NO.: 13

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex4BR

<400>

cgccccacc ctgccccgcc

<210> SEQ ID NO.: 14

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex6F

<400>

tecteettee tetetetgge

<210> SEQ ID NO.: 15

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex6R

<400>

tctgcaagcc gcctgcaccg

<210> SEQ ID NO.: 16

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> MutC255GF

<400>

ctctggctctc acagtgacac gc

<210> SEQ ID NO.: 17

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Mut E291XR

<400>

gcaccgagac tcaccgcaat

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex7F

<400>

ggcgaaggga tgggtagggg

<210> SEQ ID NO.: 19

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex7R

<400>

gttgccatgt caggaagcgc

<210> SEQ ID NO.: 20

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex9F

<400>

ccctgacct cgctccccgg

<210> SEQ ID NO.: 21

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex9R

<400>

gctgcaggca ggggcgacgc

<210> SEQ ID NO.: 22

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex10F

<400>

atgcccttct ctcctcctgc

<210> SEQ ID NO.: 23

<211>24

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex10R

<400>

agccctcagc gtcgtggata

<210> SEQ ID NO.: 24

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Mut1432delGF

<400>

gggacatcca ggccccgcc

<210> SEQ ID NO.: 25

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex11F

<400>

tectececg cectecagee

<210> SEQ ID NO.: 26

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex11R

<400>

gctgggacgg ctgtcctgcg

<210> SEQ ID NO.: 27

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

```
<223> Ex13F
```

<400>

gtcatcttcc ttgctgcctg

<210> SEQ ID NO.: 28

<211>30

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex13R

<400>

ttccacaagg aggtttcaag gttgggggg

<210> SEQ ID NO.: 29

<211>13

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> MutH635NR

<400>

acctcttggc tgggtcaggt tct

<210> SEQ ID NO.: 30

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex14F

<400>

aaatttctgg aatcttctgg

<210> SEQ ID NO.: 31

<211> 20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex14R

<400>

gcagagagag gctcaggagg

<210> SEQ ID NO.: 32

<211>22

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex15F

<400>

gaagggcctg cagcacgtgg ca

<210> SEQ ID NO.: 33

<211>19

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex15R

<400>

tagggagggc ccagtcttt

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex17F

<400>

gggtctctgg tctcgggggc

<210> SEQ ID NO.: 35

<211>22

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<223> Ex17R

<400>

ggctctggct ttctagagag gg

<210> SEQ ID NO.: 36

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cgggtcggga cactgcctgg cag

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cgggtcggga ccctgcctgg cag

<210> SEQ ID NO.: 38

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgccaggca gtgtcccgac ccg

<210> SEQ ID NO.: 39

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgccaggca gggtcccgac ccg

<210> SEQ ID NO.: 40

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

atgcatttcc cgtcttggca ctg

<210> SEQ ID NO.: 41

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gatgcatttc cctcttggca ctg

<210> SEQ ID NO.: 42

<211> 25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gatgcatttc ccgtcttggc actgg

<210> SEQ ID NO.: 43

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agatgcattt ccctcttggc actgg

<210> SEQ ID NO.: 44

```
<211>25
```

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgtctcttct gtagtgtctg tcacc

<210> SEQ ID NO.: 45

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtctcttctg tctgtgtctg tcacc

<210> SEQ ID NO.: 46

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgtctcttc tgtagtgtct gtcacct

<210> SEQ ID NO.: 47

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgtctcttct gtctgtgtct gtcacct

<210> SEQ ID NO.: 48

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggccgtgtca accgctgcat tcc

<210> SEQ ID NO.: 49

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gccgtgtcaa ccgctgcatt c

<210> SEQ ID NO.: 50

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

aggaatgcag cgtttgacac ggccc

<210> SEQ ID NO.: 51

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gaggaatgca gcgtttgaca cggcccc

<210> SEQ ID NO.: 52

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agctgtgggg gccgtgtcaa ccg

<210> SEQ ID NO.: 53

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agctgtgggg gcgtgtcaac cgc

<210> SEQ ID NO.: 54

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cggttgacac ggccccaca gct

<210> SEQ ID NO.: 55

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcggttgaca cgccccaca gct

<210> SEQ ID NO.: 56

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

caaggctgtc gtaagtgtgg c

<210> SEQ ID NO.: 57

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

```
<400>
```

gcaaggctgt cgtaagtgtg gcc

<210> SEQ ID NO.: 58

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

caaggctgtc gttaagtgtg gcc

<210> SEQ ID NO.: 59

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

aaggctgtcg ttaagtgtgg c

<210> SEQ ID NO.: 60

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gacaacgacc ccgactgcga agatg

<210> SEQ ID NO.: 61

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gacaacgacc cccgactgcg aagat

<210> SEQ ID NO.: 62

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

acaacgaccc cgactgcgaa gat

<210> SEQ ID NO.: 63

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

acaacgaccc ccgactgcga aga

<210> SEQ ID NO.: 64

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

```
<221> oligonucleotide
```

<400>

geggeeacte ateegageea tet

<210> SEQ ID NO.: 65

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcggccactc acccgagcca tct

<210> SEQ ID NO.: 66

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgcggccact catccgagcc atctt

<210> SEQ ID NO.: 67

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgcggccact cacccgagcc atctt

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccagctggcg ctgtgatggt ggc

<210> SEQ ID NO.: 69

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccagctggcg ccgtgatggt ggc

<210> SEQ ID NO.: 70

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tccagctggc gctgtgatgg tggcc

<210> SEQ ID NO.: 71

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tccagctggc gccgtgatgg tggcc

<210> SEQ ID NO.: 72

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgcaaggac aaatctgacg aggaa

<210> SEQ ID NO.: 73

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgcaaggac aactgcggta tgggc

<210> SEQ ID NO.: 74

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

actgcaagga caaatctgac gaggaaa

<210> SEQ ID NO.: 75

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

actgcaagga caactgcggt atgggcg

<210> SEQ ID NO.: 76

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

caaatctgac gaggaaaact gcggt

<210> SEQ ID NO.: 77

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

caaatctgac gacaaatctg acgag

<210> SEQ ID NO.: 78

<211>27

```
<212> polynucleotide
```

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

acaaatctga cgaggaaaac tgcggta

<210> SEQ ID NO.: 79

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

acaaatctga cgacaaatct gacgagg

<210> SEQ ID NO.: 80

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gggtccctcg cagagtgtca ctg

<210> SEQ ID NO.: 81

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gggtccctcg ccgagtgtca ctg

<210> SEQ ID NO.: 82

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgggtccctc gcagagtgtc actgt

<210> SEQ ID NO.: 83

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgggtccctc gccgagtgtc actgt

<210> SEQ ID NO.: 84

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

aacccatcaa agagtgcggt gag

<210> SEQ ID NO.: 85

<211>23

```
<212> polynucleotide
```

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

aacccatcaa atagtgcggt gag

<210> SEQ ID NO.: 86

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gaacccatca aagagtgcgg tgagt

<210> SEQ ID NO.: 87

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gaacccatca aatagtgcgg tgagt

<210> SEQ ID NO.: 88

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tcactctcgg gcccctacca

<210> SEQ ID NO.: 89

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tcactctcgg acccctaccc a

<210> SEQ ID NO.: 90

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cacteteggg cccctacce

<210> SEQ ID NO.: 91

<211>19

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cactctcgga cccctaccc

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

acgagtgcct gtgcgccgac ggctt

<210> SEQ ID NO.: 93

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

acgagtgcct gtacgccgac ggctt

<210> SEQ ID NO.: 94

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cgagtgcctg tgcgccgacg gct

<210> SEQ ID NO.: 95

<211>23

<212> polynucleotide

<213> artificial sequence

```
<220>
```

<221> oligonucleotide

<400>

cgagtgcctg tacgccgacg gct

<210> SEQ ID NO.: 96

<211>24

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcgaagatgc gaaggtgatt ccgg

<210> SEQ ID NO.: 97

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggcccagcga agatttccgg gtggg

<210> SEQ ID NO.: 98

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agcgaagatg cgaaggtgat ttccggg

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tggcccagcg aagatttccg ggtggga

<210> SEQ ID NO.: 100

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgaagaagag gtaggcgatg g

<210> SEQ ID NO.: 101

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cggttggtga agacgatgga g

<210> SEQ ID NO.: 102

<211>23

```
<212> polynucleotide
```

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtgaagaaga ggtaggcgat gga

<210> SEQ ID NO.: 103

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccggttggtg aagacgatgg agc

<210> SEQ ID NO.: 104

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctccatcgcc tacctcttct tcacc

<210> SEQ ID NO.: 105

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

```
<400>
```

ctccatcgcc taactcttct tcacc

<210> SEQ ID NO.: 106

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gctccatcgc ctacctcttc ttcacca

<210> SEQ ID NO.: 107

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gctccatcgc ctaactcttc ttcacca

<210> SEQ ID NO.: 108

<211> 25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgccggttgg tgaagaagag gtagg

<210> SEQ ID NO.: 109

```
<211>25
```

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtgccggttg gtgagaagag gtagg

<210> SEQ ID NO.: 110

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtgccggttg gtgaagaaga ggtaggc

<210> SEQ ID NO.: 111

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cgtgccggtt ggtgagaaga ggtaggc

<210> SEQ ID NO.: 112

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

```
<221> oligonucleotide
```

<400>

caatagaatc tactggtctg acctg

<210> SEQ ID NO.: 113

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

caatagaatc tagtggtctg acctg

<210> SEQ ID NO.: 114

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcaatagaat ctactggtct gacctgt

<210> SEQ ID NO.: 115

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcaatagaat ctagtggtct gacctgt

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggcccccgac gggctggctg tggac

<210> SEQ ID NO.: 117

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggcccccgac ggctggctgt ggact

<210> SEQ ID NO.: 118

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtccacagcc agcccgtcgg gggcc

<210> SEQ ID NO.: 119

<211>25

<212> polynucleotide

<213> artificial sequence

```
<220>
<221>
```

<221> oligonucleotide

<400>

agtccacagc cagccgtcgg gggcc

<210> SEQ ID NO.: 120

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcgggagttc cccagtcagt ccagt

<210> SEQ ID NO.: 121

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcgggagttc cctagtcagt ccagt

<210> SEQ ID NO.: 122

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cgggagttcc ccagtcagtc cag

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cgggagttcc ctagtcagtc cag

<210> SEQ ID NO.: 124

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgtccccag aggatatggt tctct

<210> SEQ ID NO.: 125

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgtccccag agaatatggt tctct

<210> SEQ ID NO.: 126

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgtccccaga ggatatggtt ctc

<210> SEQ ID NO.: 127

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgtccccaga gaatatggtt ctc

<210> SEQ ID NO.: 128

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tggttctctt ccacaacctc acc

<210> SEQ ID NO.: 129

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tggttctctt caacaacctc acc

<210> SEQ ID NO.: 130

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

atggttctct tccacaacct caccc

<210> SEQ ID NO.: 131

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

atggttctct tcaacaacct caccc

<210> SEQ ID NO.: 132

<211> 25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gctgaccttt agcctgacgg tggat

<210> SEQ ID NO.: 133

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agctgacctt tagctgacgg tggat

<210> SEQ ID NO.: 134

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agctgacctt tagcctgacg gtggatg

<210> SEQ ID NO.: 135

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gagctgacct ttagctgacg gtggatg

<210> SEQ ID NO.: 136

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgctcctcgt cttcctttgc ctg

<210> SEQ ID NO.: 137

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgctcctcgg ggtctttgcc tgg

<210> SEQ ID NO.: 138

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtgctcctcg tcttcctttg cctgg

<210> SEQ ID NO.: 139

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtgctcctcg gggtctttgc ctggg

<210> SEQ ID NO.: 140

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gactcacage acgteteetg ggact

<210> SEQ ID NO.: 141

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gactcacage acateteetg ggact

<210> SEQ ID NO.: 142

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

actcacagca cgtctcctgg gac

<210> SEQ ID NO.: 143

<211>23

<212> polynucleotide

<220>

<221> oligonucleotide

<400>

actcacagca catctcctgg gac

<210> SEQ ID NO.: 144

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccatcgtggc agcgaaactc gtc

<210> SEQ ID NO.: 145

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

atgcacttcc cacgtcctgg gag

<210> SEQ ID NO.: 146

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

catcgtggca gcgaaactcg t

<210> SEQ ID NO.: 147

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgcacttccc acgtcctggg a

210> SEQ ID NO.: 148

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide Ex8F

<400>

cattggggaa gagcctcccc

210> SEQ ID NO.: 149

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide Ex8R

<400>

gcctgcaagg ggtgaggccg

210> SEQ ID NO.: 150

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide Ex12F

<400>

actggcatca gcacgtgacc

210> SEQ ID NO.: 151

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide Ex12R

<400>

cgtgtgtcta tccggccacc

210> SEQ ID NO.: 152

<211>20

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide Ex16F

<400>

gcgctttcct gccgtgacca

210> SEQ ID NO.: 153

<211>23

<212> polynucleotide

<220>

<221> oligonucleotide Ex16R

<400>

cctgtccagg agaaaaagtg aac

210> SEQ ID NO.: 154

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide MutI771TF

<400>

cagtagcgtg agggctctgt caa

210> SEQ ID NO.: 155

<211>19

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide Mut2389+4A>GR

<400>

ctgggggacc ggccggcgc

210> SEQ ID NO.: 156

<211>23

<212> polynucleotide

<221> oligonucleotide

<400>

tgtcaagctg ggtgctgagg cag

210> SEQ ID NO.: 157

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgtcaagctg gttgctgagg cag

210> SEQ ID NO.: 158

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtcaagctgg gtgctgaggc a

210> SEQ ID NO.: 159

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtcaagctgg ttgctgaggc a

210> SEQ ID NO.: 160

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggtccctcgc agagtgtcac tgt

210> SEQ ID NO.: 161

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggtccctcgc actgtgagag cca

210> SEQ ID NO.: 162

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gtccctcgca gagtgtcact g

210> SEQ ID NO.: 163

<211>21

<212> polynucleotide

```
<221> oligonucleotide
<400>
gtccctcgca ctgtgagagc c
210> SEQ ID NO.: 164
<211>21
<212> polynucleotide
<213> artificial sequence
<220>
<221> oligonucleotide
<400>
ccgtcggggg cctggatgtc t
210> SEQ ID NO.: 165
<211>21
<212> polynucleotide
<213> artificial sequence
<220>
<221> oligonucleotide
<400>
cccgtcgggg tctggatgtc t
210> SEQ ID NO.: 166
<211>23
<212> polynucleotide
```

<213> artificial sequence

<221> oligonucleotide

<220>

<400>

cccgtcgggg gcctggatgt ctc

210> SEQ ID NO.: 167

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcccgtcggg gtctggatgt ctc

210> SEQ ID NO.: 168

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccggttggtg aagaagaggt aggcg

<210> SEQ ID NO.: 169

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cggttggtga agaaagaggt aggcg

<210> SEQ ID NO.: 170

```
<211>27
```

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gccggttggt gaagaagagg taggcga

<210> SEQ ID NO.: 171

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccggttggtg aagaaagagg taggcga

<210> SEQ ID NO.: 172

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

actggaagct ggcgggacca cag

<210> SEQ ID NO.: 173

<211>23

<212> polynucleotide

<220>

<221> oligonucleotide

<400>

gcactggaag ctgggaccac agg

<210> SEQ ID NO.: 174

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgtggtccc gccagcttcc agt

<210> SEQ ID NO.: 175

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cctgtggtcc cagcttccag tgc

<210> SEQ ID NO.: 176

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcgggagttc cccagtcagt c

<210> SEQ ID NO.: 177

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcgggagttc accagtcagt c

<210> SEQ ID NO.: 178

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggcgggagtt ccccagtcag tcc

<210> SEQ ID NO.: 179

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggcgggagtt caccagtcag tcc

<210> SEQ ID NO.: 180

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccccatcggt aagcgcgggc cgg

<210> SEQ ID NO.: 181

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccccatcggt aggcgcgggc cgg

<210> SEQ ID NO.: 182

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccggcccgcg cttaccgatg ggg

<210> SEQ ID NO.: 183

<211>23

<212> polynucleotide

```
<220>
```

<221> oligonucleotide

<400>

ccggcccgcg cctaccgatg ggg

<210> SEQ ID NO.: 184

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gaaaagaggc tggcccaccc ctt

<210> SEQ ID NO.: 185

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gaaaagaggc ttctccttgg ccg

<210> SEQ ID NO.: 186

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

aaaagaggct ggcccacccc t

<210> SEQ ID NO.: 187

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

aaaagaggct tctccttggc c

<210> SEQ ID NO.: 188

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cgccttcccg tgctcaccca cagcc

<210> SEQ ID NO.: 189

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cgccttcccg tgttcaccca cagcc

<210> SEQ ID NO.: 190

```
<211>25
```

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggctgtgggt gagcacggga aggcg

<210> SEQ ID NO.: 191

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggctgtgggt gaccacggga aggcg

<210> SEQ ID NO.: 192

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

actatctcca ccgtggtgag cccag

<210> SEQ ID NO.: 193

<211>25

<212> polynucleotide

```
<220>
```

<221> oligonucleotide

<400>

actatctcca ccatggtgag cccag

<210> SEQ ID NO.: 194

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgggctcac cacggtggag atagt

<210> SEQ ID NO.: 195

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgggctcac catggtggag atagt

<210> SEQ ID NO.: 196

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gggctctgtc cattgtcctc cccat

<210> SEQ ID NO.: 197

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gggctctgtc cactgtcctc cccat

<210> SEQ ID NO.: 198

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

atggggagga caatggacag agccc

<210> SEQ ID NO.: 199

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

atggggagga cagtggacag agccc

<210> SEQ ID NO.: 200

```
<211>25
```

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgcaacatgg ctagagactg ccggg

<210> SEQ ID NO.: 201

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgcaacatgg ctggagactg ccggg

<210> SEQ ID NO.: 202

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gcaacatggc tagagactgc cgg

<210> SEQ ID NO.: 203

<211>23

<212> polynucleotide

<220>

<221> oligonucleotide

<400>

gcaacatggc tggagactgc cgg

<210> SEQ ID NO.: 204

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgctgatgac ggtgtcatag gaa

<210> SEQ ID NO.: 205

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgctgatgac gatgtcatag gaa

<210> SEQ ID NO.: 206

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gctgatgacg gtgtcatagg a

<210> SEQ ID NO.: 207

<211>21

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gctgatgacg atgtcatagg a

<210> SEQ ID NO.: 208

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tccaaacttc actccatctc aag

<210> SEQ ID NO.: 209

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tccaaacttc agtccatctc aag

<210> SEQ ID NO.: 210

```
<211> 23
```

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cttgagatgg agtgaagttt gga

<210> SEQ ID NO.: 211

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cttgagatgg actgaagttt gga

<210> SEQ ID NO.: 212

<211> 25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gccaagtgga ctgcgacaac ggctc

<210> SEQ ID NO.: 213

<211>25

<212> polynucleotide

```
<220>
```

<221> oligonucleotide

<400>

gccaagtgga ctacgacaac ggctc

<210> SEQ ID NO.: 214

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gagccgttgt cgcagtccac ttggc

<210> SEQ ID NO.: 215

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gagccgttgt cgtagtccac ttggc

<210> SEQ ID NO.: 216

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgctggcca gggacatgag gagct

```
<210> SEQ ID NO.: 217
```

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctgctggcca ggtacatgag gagct

<210> SEQ ID NO.: 218

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agctcctcat gtccctggcc agcag

<210> SEQ ID NO.: 219

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agctcctcat gtacctggcc agcag

<210> SEQ ID NO.: 220

<211>25

<212> polynucleotide

```
<220>
<221> oligonucleotide
<400>
ctcgccgcgg cggggactgc aggta
<210> SEQ ID NO.: 221
<211>25
<212> polynucleotide
<213> artificial sequence
<220>
<221> oligonucleotide
<400>
ctcgccgcgg cgaggactgc aggta
<210> SEQ ID NO.: 222
<211>25
<212> polynucleotide
<213> artificial sequence
<220>
<221> oligonucleotide
<400>
tacctgcagt ccccgccgcg gcgag
<210> SEQ ID NO.: 223
<211>25
<212> polynucleotide
<213> artificial sequence
<220>
```

<221> oligonucleotide

```
<400>
```

tacctgcagt cctcgccgcg gcgag

```
<210> SEQ ID NO.: 224
```

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gaccatcttg gaggatgaaa agagg

<210> SEQ ID NO.: 225

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gaccatcttg gacgatgaaa agagg

<210> SEQ ID NO.: 226

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cctctttca tcctccaaga tggtc

```
<210> SEQ ID NO.: 227
```

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cctcttttca tcgtccaaga tggtc

<210> SEQ ID NO.: 228

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gttttcctcg tcagatttgt ccttgca

<210> SEQ ID NO.: 229

<211>27

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gttttcctcg tcacatttgt ccttgca

<210> SEQ ID NO.: 230

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ttttcctcgt cagatttgtc cttgc

<210> SEQ ID NO.: 231

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ttttcctcgt cacatttgtc cttgc

<210> SEQ ID NO.: 232

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ttgtccttgc agtcggggcc acta

<210> SEQ ID NO.: 233

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

```
<400>
```

ttgtccttgc agacggggcc accat

<210> SEQ ID NO.: 234

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgtccttgca gtcggggcca cca

<210> SEQ ID NO.: 235

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tgtccttgca gacggggcca cca

<210> SEQ ID NO.: 236

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agcccagtag cgtgagggct ctgtc

```
<210> SEQ ID NO.: 237
```

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

agcccagtag cgagagggct ctgtc

<210> SEQ ID NO.: 238

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gacagagece teacgetact ggget

<210> SEQ ID NO.: 239

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

gacagagccc tctcgctact gggct

<210> SEQ ID NO.: 240

<211>25

<212> polynucleotide

- <213> artificial sequence
- <220>
- <221> oligonucleotide
- <400>

tcgccttgct cctcgccgcg gcggg

- <210> SEQ ID NO.: 241
- <211>25
- <212> polynucleotide
- <213> artificial sequence
- <220>
- <221> oligonucleotide
- <400>

tcgccttgct ccccgccgcg gcggg

- <210> SEQ ID NO.: 242
- <211> 25
- <212> polynucleotide
- <213> artificial sequence
- <220>
- <221> oligonucleotide
- <400>

cccgccgcgg cgaggagcaa ggcga

- <210> SEQ ID NO.: 243
- <211>25
- <212> polynucleotide
- <213> artificial sequence
- <220>
- <221> oligonucleotide

<400>

cccgccgcgg cggggagcaa ggcga

<210> SEQ ID NO.: 244

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

acggctacag ctacccctcg gtgag

<210> SEQ ID NO.: 245

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cggctacagc taccccctcg gtgag

<210> SEQ ID NO.: 246

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctcaccgagg ggtagctgta gccgt

<210> SEQ ID NO.: 247

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctcaccgagg gggtagctgt agccg

<210> SEQ ID NO.: 248

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cccaggagac gtgctgtgag tcccc

<210> SEQ ID NO.: 249

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cccaggagac gtactgtgag tcccc

<210> SEQ ID NO.: 250

<211>25

<212> polynucleotide

<220>

<221> oligonucleotide

<400>

ggggactcac agcacgtctc ctggg

<210> SEQ ID NO.: 251

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ggggactcac agtacgtctc ctggg

<210> SEQ ID NO.: 252

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctcccatcg gtaagcgcgg gccgg

<210> SEQ ID NO.: 253

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ctcccatcg gtcagcgcgg gccgg

<210> SEQ ID NO.: 254

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccggcccgcg cttaccgatg gggag

<210> SEQ ID NO.: 255

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccggcccgcg ctgaccgatg gggag

<210> SEQ ID NO.: 256

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

ccagtacatg aagctggtgg gaga

<210> SEQ ID NO.: 257

<211>25

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

tcttgatctt ggcctgggga cagag

<210> SEQ ID NO.: 258

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cagtacatga agctggtggg agg

<210> SEQ ID NO.: 259

<211>23

<212> polynucleotide

<213> artificial sequence

<220>

<221> oligonucleotide

<400>

cttgatcttg gcctggggac aga